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Environmental Assessment
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PROPOSED TRAVEL MANAGEMENT PLAN FOR LITTLEFIELD, ST. GEORGE BASIN AND COLORADO CITY TRAVEL SUB-REGIONS

MOHAVE COUNTY, ARIZONA

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Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
AGFD	Arizona Game and Fish Department
ATV	All-Terrain Vehicle
BLM	Bureau of Land Management
CAA	Clean Air Act
CFR	Code of Federal Regulations
DFC	Desired Future Conditions
EA	Environmental Assessment
EIS	Environmental Impact Statement
ERMA	Extensive Recreation Management Area
FONSI	Finding of No Significant Impact
GMU	Game Management Unit
MSO	Mexican Spotted Owl
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OHV	Off-Highway Vehicle
PSD	Prevention of Significant Deterioration
RMP	Resource Management Plan
RMZ	Recreation Management Zone
SRMA	Special Recreation Management Area
SRP	Special Recreation Permit
TCP	Traditional Cultural Property
TMA	Travel Management Area
TMP	Travel Management Plan
USBR	U.S. Bureau of Reclamation
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WHA	Wildlife Habitat Area

Chapter 1

INTRODUCTION

1.1 INTRODUCTION

This travel management plan (TMP) is the product of extensive public and agency input. Its intent is to establish a comprehensive travel network, and meet both current and future access needs to the area's public lands while resolving conflicts of users of the travel network identified in this document. This document identifies a proposed system of roads, primitive roads and trails that best meets the full range of public, resource management, and administrative access need while protecting resources found in the planning area.

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of implementing the proposed TMP for the Littlefield, St. George Basin, and Colorado City travel sub-regions (hereinafter "sub-regions") on the Arizona Strip Field Office. The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the Bureau of Land Management (BLM) in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 Code of Federal Regulations (CFR) 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A Decision Record, including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the Proposed Resource Management Plan [RMP]/Final EIS for the Arizona Strip Field Office, the Vermilion Cliffs National Monument, and the BLM Portion of the Grand Canyon-Parashant National Monument (BLM and NPS 2007).

1.2 BACKGROUND

In 2008, the BLM's Arizona Strip Field Office RMP was completed. The travel management network (i.e., route designations) for the field office was not completed during the land use planning process due to the size of the area, as well as the complexity of the travel management planning issue on the Arizona Strip. A preliminary travel network, based upon existing routes, was identified in the RMP (BLM 2008). A route inventory and detailed route evaluations have now been completed, and this EA is being prepared to analyze the proposed route designations and comprehensive TMP for motorized/mechanized vehicle use and non-motorized use on routes in the Littlefield, St. George Basin, and Colorado City sub-regions (see Figure 1.2-1). These sub-regions are located in the urban-interface areas surrounding the Arizona Strip, near the rapidly expanding communities of Littlefield and Beaver Dam, Arizona/Mesquite, Nevada; St. George, Utah; and Hildale, Utah/Colorado City, Arizona. As the population of these areas grows, so does the demand for recreational opportunities and other uses on public lands. These areas are used for motorized recreation, hiking, biking, equestrian use, hunting, camping, and sightseeing. The area also contains a major utility corridor, the Old Spanish National Historic Trail, livestock grazing allotments, active mining operations, designated wilderness, wilderness characteristics areas, and private/state lands.

1.3 PURPOSE AND NEED

Federal agencies are directed to manage motorized vehicle use on public lands through Executive Order 11644 and Executive Order 11989 (see Section 1.5), which have been incorporated into the regulations under 43 CFR 8342.1. Comprehensive travel management is the planned management of public access, natural resources and regulatory needs to ensure that all aspects of road and trail system planning and on the ground management are considered. This includes natural and cultural resource management, road and trail design, maintenance, motorized and non-motorized recreation and non-recreation uses of the roads, primitive roads, and trails, and public compliance with route designations. As described in Section 1.2 above, a preliminary network was identified in the RMP, which must now be refined and selected through the EA process. The purpose of the proposed transportation network for the Littlefield, St. George Basin, and Colorado City Sub-regions is to develop a defined travel management network of designated routes within these areas. The transportation system identified should:

- Meet resource program goals and objectives, and be consistent with social and environmental objectives for allowing travel and determining transportation networks in the area;
- Provide appropriate levels of access and associated benefits to both recreation travelers and resource users;
- Ensure that prescribed setting characteristics are maintained; and
- Establish the primary means and modes of travel allowed for accomplishing planning objectives identified in the RMP (BLM 2008a).

A TMP is a comprehensive plan for future management of the route network for all public land access needs. Access needs are identified by the BLM, other agencies, authorized users (hunters, ranchers, mineral site users, commercial recreation users, etc.), local communities, and members of the public and are evaluated in conjunction with the BLM's legal mandate to protect natural and cultural resources. This travel network is therefore needed to provide a well-defined, properly documented/authorized, and environmentally sound travel network for sufficient access and transportation on BLM-administered public land with opportunities for recreation while reducing conflicts between different users, as well as protecting sensitive and important resources (such as special status species, significant cultural resources, soils, etc.).

1.4 CONFORMANCE WITH LAND USE PLAN

The proposed action and alternatives described in Chapter 2 are in conformance with the *Arizona Strip Field Office RMP*, approved on January 29, 2008 (BLM 2008a). The proposed action and alternatives are consistent with the following decisions contained within this plan. It has also been determined that the proposed action and alternatives would not conflict with other decisions throughout the plan.

The following decisions are from Table 2.14 in the RMP regarding Travel Management:

- **DFC-TM-01:** The region's remoteness, scenic beauty, open spaces and natural and cultural resources will be maintained by careful travel management.
- **DFC-TM-02:** A variety of existing motorized, mechanized, and non-motorized trail and travel opportunities will be sustained, where needed, to meet public and administrative needs.
- **DFC-TM-03:** Compatible traditional, current, and future use of the land will be sustained by establishing a transportation system that contributes to protection of sensitive resources, promotes dispersed recreation, and minimizes user conflicts.

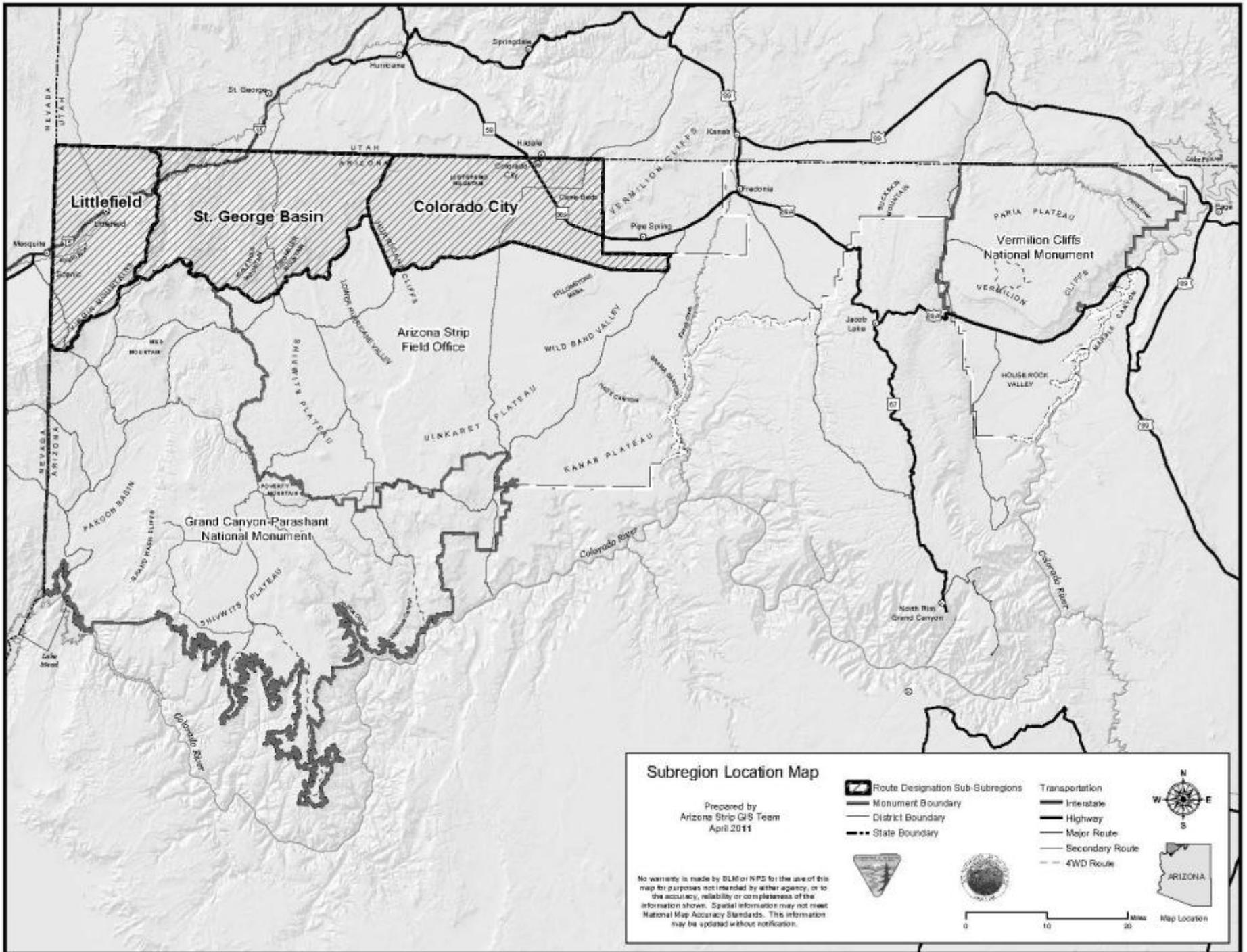


Figure 1.1. Sub-region Location Map

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- **DFC-TM-04:** Public use, resource management, and regulatory needs will be considered through travel management planning, incorporating consideration of the effects of, and interactions among, all forms of travel including motorized, mechanized, non-motorized/non-mechanized, equestrian and other livestock, walking, mountain biking, and other travel modes.
 - **DFC-TM-05 (which states in part):** The Rural TMA will provide for the widest variety of motorized, non-motorized, and mechanical travel modes to serve existing and future recreational, traditional, casual, commercial, educational, and private needs adjacent to communities, but not to the detriment or exclusion of the protection of resources. It will also facilitate linking existing and future regional travel corridors to local communities.
 - **DFC-TM-06 (which states in part):** The Backways TMA will provide for a variety of motorized, non-motorized, and mechanical travel modes to serve existing and future recreational, traditional, casual, commercial, educational, and private needs, but not to the detriment or exclusion of the protection of resources. It will also supply the primary travel system that will provide public entry from communities to the more remote and semi-primitive TMAs.
 - **DFC-TM-07 (which states in part):** The Specialized TMA will provide for a variety of motorized, non-motorized, and mechanical travel modes to serve existing and future recreational, traditional, casual, commercial, and private needs in remote, rustic settings, but not to the detriment or exclusion of the protection of resources. It will also be characterized by low to moderate densities of improved roads and primitive roads that will provide public entry portals from Backways corridors to the more remote Primitive TMAs.
 - **DFC-TM-08 (which states in part):** The Primitive TMA will provide for adequate, but limited motorized travel to serve existing and future traditional, casual, some commercial, private, and emergency needs and for non-motorized, non-mechanized travel to serve existing and future recreational needs in the most remote, rustic settings, for the enhancement and protection of important resource values. It will also range from large areas containing no routes to areas characterized by low densities of primitive roads that will provide entry to authorized management facilities for administrative users.
 - **MA-TM-09:** Routes causing resource damage or with safety concerns can be rerouted and/or reclaimed. Minor rerouting of roads into areas where wilderness characteristics are to be maintained can be considered when it is determined that: 1) it resolves the concerns previously mentioned; 2) the road is an important travel link for public and administrative uses; 3) topography and engineering capabilities require consideration of such a reroute; and 4) public motorized and mechanized travel will remain on the road through the area.

Rehabilitation of closed routes will only occur after completion of NEPA review and compliance with the requirements of Section 106 of the NHPA.

- **MA-TM-16:** In ACECs (see Special Status Species decisions):
 - Some rerouting of existing roads may occur.
 - Criteria must be met for modifications to existing roads.
 - Establishment of new permanent roads and/or upgrades may be restricted.
 - Speed limits may apply.

The following decisions are from Table 2.14 in the RMP regarding Recreation and Visitor Services:

- **DFC-RR-01:** Recreation and visitor will be managed to provide varying levels of both:
 1. Structured recreation opportunities that offer a range of specific benefits, activities, and experiences within outdoor settings (SRMAs; see Map 2.13) and/or,

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2. Dispersed, unstructured recreation opportunities that focus only on visitor health and safety, user conflict, and resource protection issues (extensive recreation management areas (ERMAs)).
- **DFC-RR-04:** The excellent opportunities that exist to enjoy remote, rustic settings that provide moderate challenge and solitude in the Specialized TMAs will be maintained/enhanced.
 - **DFC-RR-05:** In Backways and Specialized TMAs, recreation opportunities associated with somewhat remote settings, such as exploring backcountry roads, vehicle camping, hunting, sightseeing, recreation aviation, and picnicking will be maintained/enhanced on existing roads, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.
 - **DFC-RR-06:** In the Primitive TMA, high quality recreation opportunities associated more with primitive recreation experience opportunities and non-motorized uses such as camping, sightseeing, hiking, horseback riding, and hunting, will be maintained/enhanced, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.
 - **DFC-RR-07:** In Rural TMA, a wide variety of recreation opportunities associated with near-urban settings, such as walking, [off-highway vehicle] OHV play, equestrian, rock crawling, mountain biking, and viewing events, may be maintained/enhanced, provided they will be compatible with the protection of sensitive resource values.
 - **DFC-RR-13:** The primary strategy for the St. George Basin SRMA will be to target a demonstrated community recreation-tourism market demand from primarily local communities (dependent on public lands recreation and/or related tourism use, growth, and/or development), as well as some other seasonal regional visitors, for motorized/mechanized/non-mechanized exploring, technical sports, fitness activities, guided tours, sightseeing, equestrian, hiking, competitive and organized events, viewing and appreciating natural landscapes and cultural sites. This demand is supported by the area's distinctive landscape, warm winters, and its close proximity to the rapidly growing communities of St. George, Santa Clara, Middleton, Washington, Hurricane, and Toquerville, Utah. Local recreation-tourism visitors value these public lands as their own 'back-yard' recreation settings.
 - **DFC-RR-14 (which states in part):** The St. George Basin Rural Park RMZ will be managed for:
 - Quick, easy access from town to sustainable day-use adventure, challenge, exercise, social, and outdoor recreation.
 - Exploring activities (*i.e.*, *OHV driving, all-terrain vehicle (ATV) and motorcycle riding, equestrian, hiking*); personal challenge activities (*i.e.*, *rock climbing, rock crawling, mountain biking, competitive events*); social activities (*i.e.*, *organized group/family events*); and fitness activities (*i.e.*, *walking, running, hiking*).
 - **DFC-RR-15 (which states in part):** The Canyons and Mesas RMZ will be managed for:
 - Self-directed, primitive, adventure in a natural setting close to town.
 - Hiking, equestrian, hunting, viewing nature.
 - **DFC-RR-16:** The primary strategy for the Virgin River SRMA will be to target a demonstrated destination recreation-tourism market demand from mainly local community residents and regional visitors for day-use and overnight hiking, family outings, rock climbing, school group field outings, and white water activities. Similarly, there is market demand from local, regional, and national visitors for sightseeing, appreciation of geologic resources, rest from travel and escaping the cold winter weather of other locations. This demand is supported by the area's distinctive location along high traffic volume Interstate Highway 15, its place in the Grand Canyon-like landscape of Virgin River Gorge, and ease of access for day and overnight

recreation. National, regional, and local recreation-tourism visitors value these public lands as recreation-tourism destinations.

The following decision is from Table 2.5 in the RMP regarding Special Status Species:

- **MA-TE-52 (which states in part):** The BLM will complete a proposal to close roads and designate routes in the desert tortoise ACECs. Roads targeted for closure will include those that: 1) have no purpose; 2) are duplicative or redundant; or 3) are causing high levels of mortality of tortoises. Vehicles will be restricted to existing roads and trails prior to route designation. After designation, vehicles will be restricted to designated or administrative routes only. Implementation of the closure/designation plan will include the following actions: 1) sign entry portals/major intersections with signs that read "Limited to Designated Roads;" 2) sign all designated routes as open; 3) and sign along designated routes indicating that driving off of designated routes is not permitted.

1.5 RELATIONSHIP TO STATUTES, REGULATIONS, OR OTHER PLANS

This EA has been prepared in accordance with the requirements of NEPA and any additional Federal, State, and local (as appropriate) statutes and laws that may be relevant to the alternatives, such as those cited below.

The alternatives are consistent with the Fundamentals of Rangeland Health (43 CFR 4180.1) and Arizona's Standards and Guidelines, which were developed through a collaborative process involving the Arizona Resource Advisory Council and the BLM State Standards and Guidelines Team. The Secretary of the Interior approved the Standards and Guidelines in April 1997. These standards and guidelines address watersheds, ecological condition, water quality, and habitat for sensitive species. These resources are addressed later in this document.

Executive Order 13186 requires the BLM and other Federal agencies to work with the U.S. Fish and Wildlife Service to provide protection for migratory birds. Implementation of the alternatives is not likely to adversely affect any species of migratory bird known or suspected to occur in the planning area. No take of any such species is anticipated.

The planning area is located in Mohave County, Arizona. The alternatives are consistent with the *Mohave County General Plan* (adopted March 1995, revised December 2005). While development of a public land transportation network is not specifically addressed in the County Plan, the following land use goals address this in a general manner:

1. **Community Balance, Goal 10** – Retain the beauty, the natural setting and resources, and the rural character of the County while providing opportunities for coordinated growth and development (page 78).
2. **Transportation, Goal 51** – Plan, construct and maintain an efficient system that is adequate to meet the mobility needs of County residents and businesses (page 134).
3. **Parks and Recreation, Goal 55** – Meet the recreational and open space needs of residents Countywide, with sites that provide for active recreation, specialized recreation and enjoyment of natural areas (page 144).

This alternatives do not conflict with goals and policies contained within the *Mohave County General Plan*.

In addition, the alternatives would comply with the following laws and/or agency regulations, and other plans, and are consistent with applicable Federal, State, and local laws, regulations, and plans to the maximum extent possible.

- Federal Land Policy and Management Act of 1976 (43 United States Code [USC] 1707 et seq.)
- Endangered Species Act of 1973, as amended
- The National Historic Preservation Act (NHPA) of 1966, as amended
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001–3013; 104 Stat. 3048-3058)
- National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq)
- Executive Order 11644 (as amended by Executive Order 11989), Use of Off-Road Vehicles on Public Lands
- Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds
- Arizona State Comprehensive Outdoor Recreation Plan (which establishes outdoor recreation priorities for Arizona that will help outdoor recreation and natural resource managers at all levels of government make decisions about the state’s outdoor recreation sites, programs and infrastructure; and encourages a better, highly integrated outdoor recreation system throughout Arizona that balances recreation and protection of natural and cultural resources).

1.6 IDENTIFICATION OF ISSUES

Identification of issues for this assessment was accomplished by considering the resources that could be affected by implementation of one of the alternatives. A summary of the issues and the rationale for analysis are given below.

- **Air Quality:** Vehicular travel on unpaved roads creates fugitive dust, with the amount of fugitive dust created depending on the type of soil, the amount of moisture in the soil, the amount of wind and humidity, and vehicle speed.
- **Cultural Resources:** Disturbances to, and management of, cultural resources are affected by access and route construction/maintenance. All of the proposed alternatives for road, route and trail designation, and their subsequent implementation actions require continuing or additional cultural resource inventory, evaluation, and monitoring on a case-by-case basis. Intentional and unintentional disturbances to cultural resources are due to surface and subsurface impacts through the proliferation of routes, route maintenance, vehicular traffic, the potential for increased concentration of use, erosion, illegal collecting, looting, and vandalism. Appropriately planned and managed access allows for the presence of law enforcement, cultural resource personnel, site stewards and researchers to assist in protecting, managing, monitoring and researching cultural resources.
- **Recreation:** A wide variety of recreation activities take place within the Littlefield, St. George Basin, and Colorado City Sub-regions. The primary activities include off-highway vehicle (OHV) use, hunting, hiking, camping, target shooting, and rock hounding. These activities require the use of roads, primitive roads, and trails. Restricting access within these sub-regions would impact the recreational opportunities provided in the planning area.
- **Soils:** Motorized use of unsurfaced and poorly constructed routes could result in soil compaction, creation of new flow paths and channels, and increased runoff.
- **Vegetation:** Disturbance to vegetation could occur during route realignment or construction, including the potential loss of shrubs, grasses, and forbs. Disturbance to vegetation also occurs

indirectly by dust accumulation immediately adjacent to roads. Noxious weeds and invasive species may also be spread by vehicular travel along roads.

- **Wetlands/ Riparian Zones:** Impacts to riparian resources, including reduced biological and hydrological function, could occur from vehicles traveling on routes within riparian areas. Closure and rehabilitation of routes could also affect riparian resources in both the short-term (from the rehabilitation process) and long-term as vegetation becomes reestablished.
- **Wildlife:** Wildlife species, including big game and migratory birds, could be impacted by roads in a variety of ways including habitat alteration, behavioral changes, and disturbance from vehicles.
- **Special Status Species:** Roads affect special status species (both plants and animals) by fragmenting habitat; reducing available habitat for breeding and foraging activities; causing injury to individual plants from crushing or removal and loss or modification of habitat; and increasing opportunities for vehicle collisions and a variety of other disturbances that change wildlife movement and habitat use.
- **Wilderness Characteristics:** Motorized vehicle use within areas managed to maintain wilderness characteristics could affect the wilderness characteristics of naturalness, solitude, and opportunities for primitive types of recreation.

Chapter 2

PROPOSED ACTION AND ALTERNATIVES

A BLM interdisciplinary team explored and evaluated several different alternatives in order to provide a broad range of travel management options that would meet the underlying need for the action, as presented in Section 1.3 of this EA. This EA addresses the No Action, Proposed Action, and two additional action alternatives. The No Action Alternative is considered and analyzed to provide a baseline for comparing the impacts of the action alternatives.

A comprehensive route system is sought in this plan. The route system proposed under each alternative has been designed to create a range of recreation opportunities while protecting resources. To meet this objective, some routes identified during the route inventory are proposed to be closed, others are reserved for administrative or authorized access only, and the remainder would remain open for public use. Routes include primitive roads, motorized single-track trails, non-motorized single track trails for mountain bikes, and non-motorized trails. All of the alternatives, except Alternative A (No Action), would close some routes. However, it is assumed that the amount of OHV use would not change greatly. Rather, the OHV use would shift and concentrate on the routes designated “open.” Segments of certain routes cross state and private land; the BLM acknowledges that it only has jurisdiction over routes on BLM-administered land. Thus, only routes on BLM-administered lands are addressed and will be designated in this TMP.

2.1 ACTIONS COMMON TO ALL ALTERNATIVES

The following actions would be implemented under all of the alternatives:

- If significant cultural resources are located along designated routes (i.e., roads, primitive roads or trails), and these resources are being adversely affected (some serious change is occurring that could affect their potential eligibility to the National Register of Historic Places (NRHP), or are of importance to American Indian tribes), actions would be recommended and considered for implementation to limit, remove, or mitigate adverse effects when and wherever practical.
- Rights-of-way would be granted to BLM for the designated travel routes and all designated travel routes would be noted to the official land records (Master Title Plats, Historical Index, LR 2000, etc.).
- Reclamation of closed routes would be prioritized based on wildlife habitat, soil loss potential, cultural resource impacts, or other resource protection needs.
- Access to existing land use authorization areas (i.e., rights-of-way/permits/leases, etc.) for operation and maintenance purposes as provided in the authorization would not be impacted as a result of the proposed TMP.

2.2 ALTERNATIVE A – NO ACTION

This alternative represents the current management condition (Figures 2.2-1 – 2.2-3). Travel would be allowed on existing roads, primitive roads, and trails identified as the preliminary route network in the Arizona Strip Field Office RMP (BLM 2008). Since that time, additional inventories have been conducted to update the preliminary route network, resulting in additional and/or corrected routes. The route designations under this alternative are displayed in Table 2.1.

Table 2.1. Route Designations – Alternative A (No Action)		
Designation	Number of Miles	Percent of Miles
<i>Littlefield Sub-region</i>		
Open to all users	416.9	97%
Limited to all-terrain (ATV) or motorcycle use	0	0%
Limited to all users with seasonal restrictions	0	0%
Limited to authorized uses	7.7	2%
Limited to non-motorized use	3.7	1%
Closed to all motorized and mechanized use	0	0%
Total	428.3	100%
<i>St. George Basin Sub-region</i>		
Open to all users	654.0	92%
Limited to ATV or motorcycle use	0	0%
Limited to all users with seasonal restrictions	12.4	2%
Limited to authorized uses	14.1	2%
Limited to non-motorized use	24.9	4%
Closed to all motorized and mechanized use	4.7	<1%
Total	710.1	100%
<i>Colorado City Sub-region</i>		
Open to all users	384.7	100%
Limited to ATV or motorcycle use	0	0%
Limited to landfill open hours	0	0%
Limited to authorized uses	0	0%
Limited to non-motorized use	0	0%
Closed to all motorized and mechanized use	0	0%
Total	384.7	100%

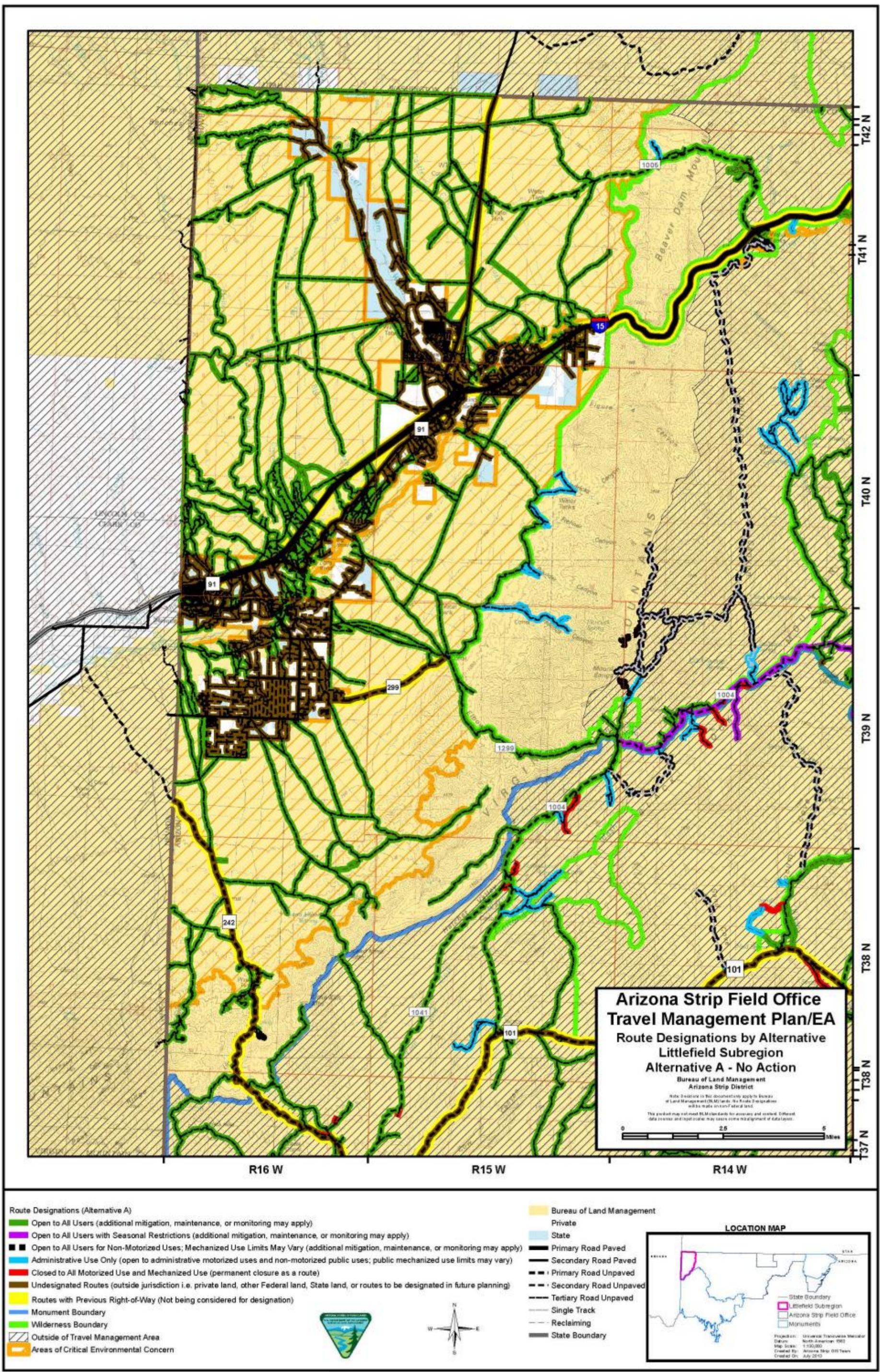
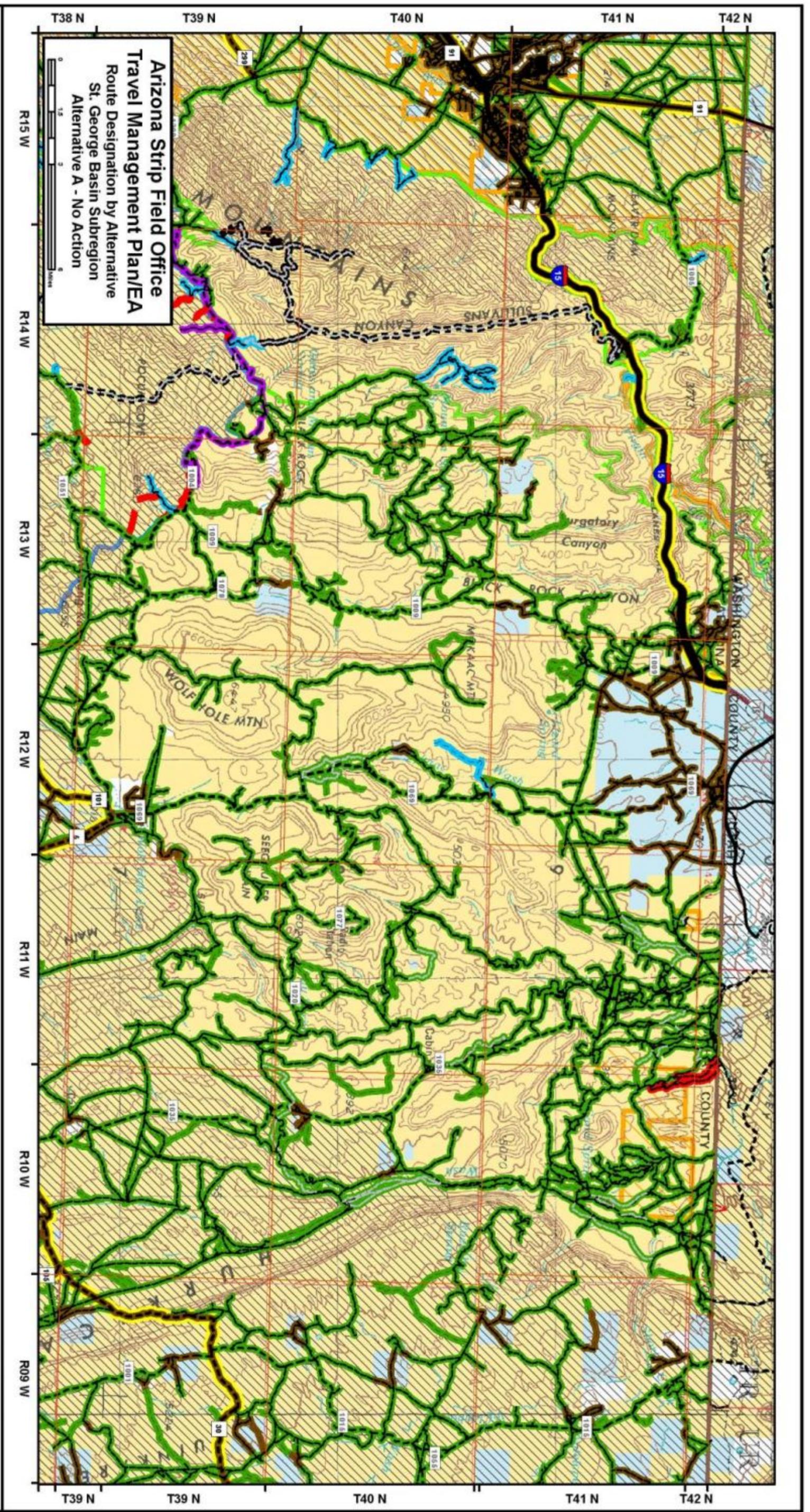


Figure 2.2-1. Alternative A for Littlefield Sub-region



**Arizona Strip Field Office
Travel Management Plan/EA
Route Designation by Alternative
St. George Basin Subregion
Alternative A - No Action**



- Legend**
- Primary Road Paved
 - Secondary Road Paved
 - Primary Road Unpaved
 - Secondary Road Unpaved
 - Tertiary Road Unpaved
 - Single Track
 - Reclaiming
- Route Designations (Alternative A)
 - Open to All Users (additional mitigation, maintenance, or monitoring may apply)
 - Open to All Users with Seasonal Restrictions (additional mitigation, maintenance, or monitoring may apply)
 - Open to All Users for Non-Motorized Users; Motorized Use Limits May Vary (additional mitigation, maintenance, or monitoring may apply)
 - Administrative Use Only (open to administrative motorized uses and non-motorized public users; public motorized use limits may vary)
 - Closed to All Motorized Use and Mechanized Use (permanent closure as a route)
 - Undesignated Routes (outside jurisdiction i.e. private land, other Federal land, State land, or routes to be designated in future planning)
 - Routes with Previous Right-of-Way (Not being considered for designation)

- Monument Boundary
- Wilderness Boundary
- State Boundary
- Outside of Travel Management Area
- Areas of Critical Environmental Concern
- Bureau of Land Management
- Private
- State



**Bureau of Land Management
Arizona Strip District**

Project: Unimproved Transverse Interceptor
 Date: North of 1980
 Map Scale: 1:50,000
 Created By: Arizona Strip OIS Team
 Checked Out: July 2012

Note: Decisions in this document only apply to Bureau of Land Management (BLM) lands. No Route Designations will be made on non-Federal land.

This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.

LOCATION MAP

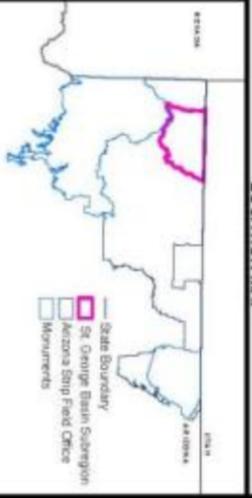


Figure 2.2-2. Alternative A for St. George Basin Sub-region

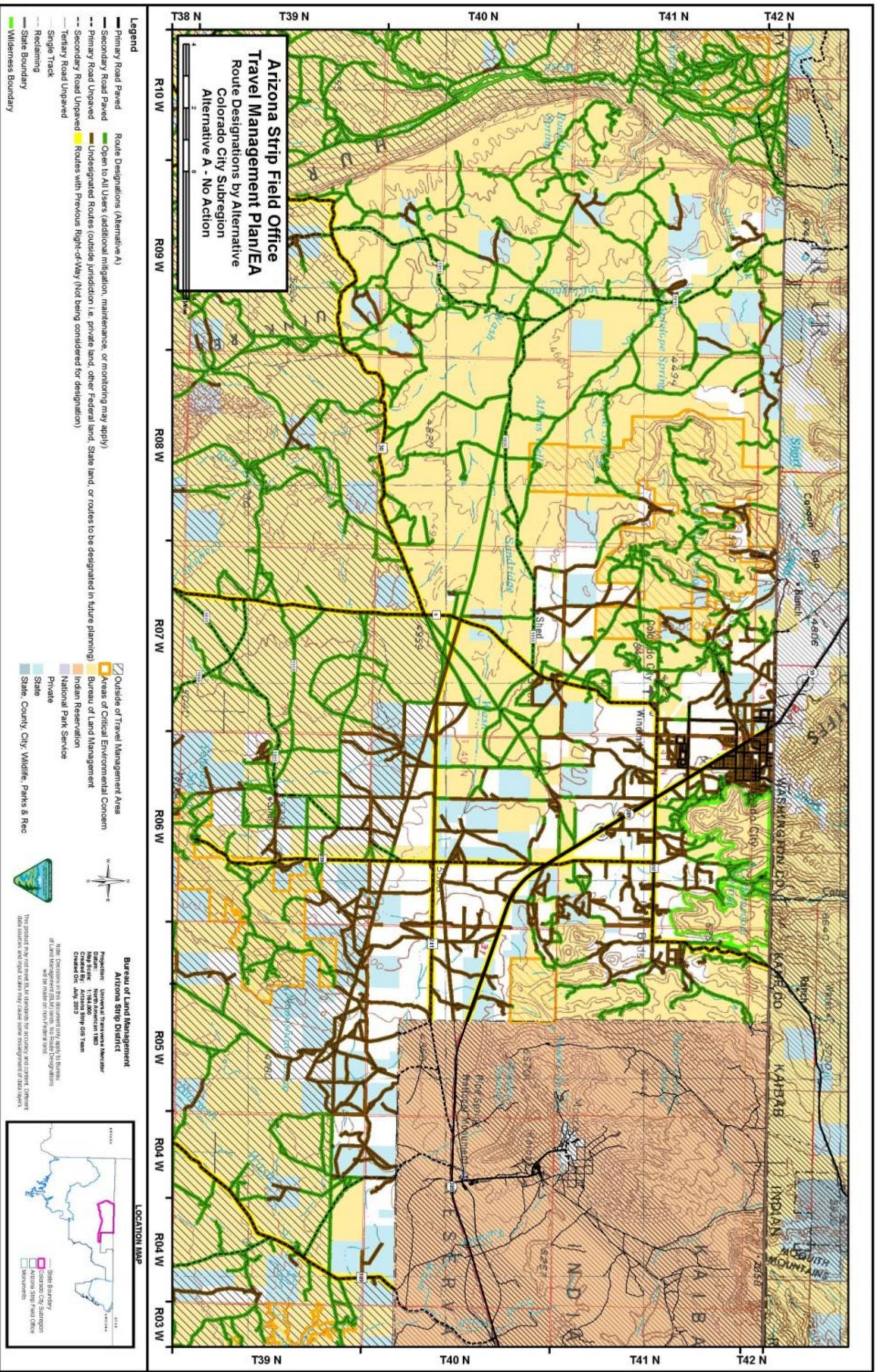
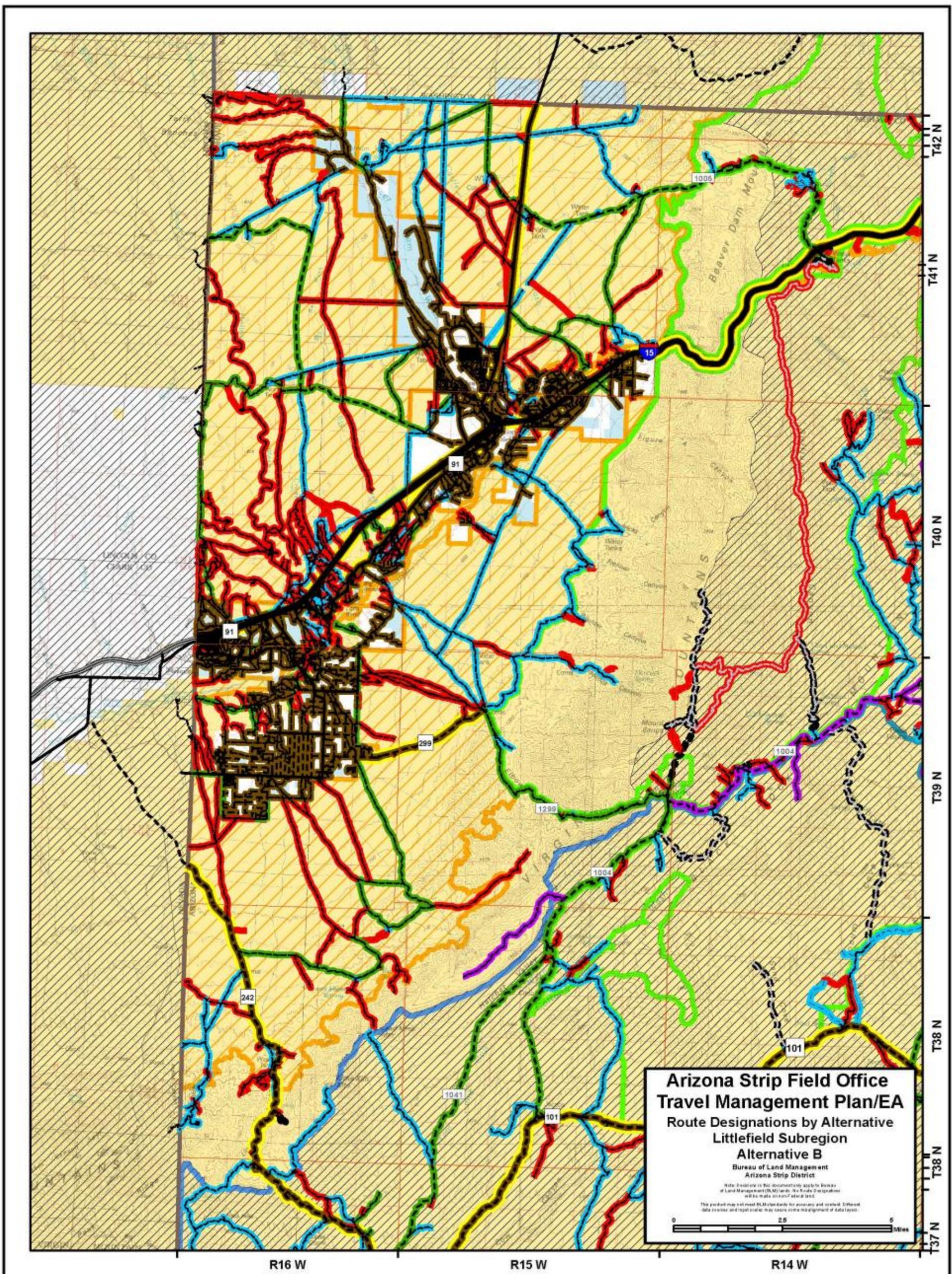


Figure 2.2-3. Alternative A for Colorado City Sub-region

2.3 ALTERNATIVE B

This alternative would provide the least amount of designated travel routes within the planning area (see Figures 2.3-1 – 2.3-3). This alternative allows OHV access for administrative purposes, such as maintenance of authorized utilities/facilities, range improvements and mining claims. This alternative would be the most restrictive to motorized public access while providing maximum protection to natural, scenic and cultural values. The route designations under this alternative are displayed in Table 2.2.

Table 2.2. Route Designations – Alternative B		
Designation	Number of Miles	Percent of Miles
<i>Littlefield Sub-region</i>		
Open to all users	80.0	19%
Limited to ATV or motorcycle use	1.8	<1%
Limited to all users with seasonal restrictions	3.1	1%
Limited to authorized uses	109.9	26%
Limited to non-motorized use	2.6	<1%
Closed to all motorized and mechanized use	230.9	54%
Total	428.3	100%
<i>St. George Basin Sub-region</i>		
Open to all users	224.0	32%
Limited to ATV or motorcycle use	30.2	4%
Limited to all users with seasonal restrictions	20.6	3%
Limited to authorized uses	148.1	21%
Limited to non-motorized use	17.2	2%
Closed to all motorized and mechanized use	270.0	38%
Total	710.1	100%
<i>Colorado City Sub-region</i>		
Open to all users	89.4	23%
Limited to landfill open hours	1.6	<1%
Limited to authorized uses	164.1	43%
Limited to non-motorized use	5.5	1%
Closed to all motorized and mechanized use	124.1	32%
Total	384.7	100%



Route Designations (Alternative B)

- Green line: Open to All Users (additional mitigation, maintenance, or monitoring may apply)
- Purple line: Open to All Users for ATV or Motorcycle Use (administrative use may vary)(additional mitigation, maintenance, or monitoring may apply)
- Black line: Open to All Users with Seasonal Restrictions (additional mitigation, maintenance, or monitoring may apply)
- Blue line: Open to All Users for Non-Motorized Uses; Mechanized Use Limits May Vary (additional mitigation, maintenance, or monitoring may apply)
- Red line: Administrative Use Only (open to administrative motorized uses and non-motorized public uses; public mechanized use limits may vary)
- Red line: Closed to All Motorized Use and Mechanized Use (permanent closure as a route)
- Brown line: Undesignated Routes (outside jurisdiction i.e. private land, other Federal land, State land, or routes to be designated in future planning)
- Yellow line: Routes with Previous Right-of-Way (Not being considered for designation)
- Orange line: Monument Boundary
- Green line: Wilderness Boundary
- Diagonal hatching: Outside of Travel Management Area
- Orange hatching: Areas of Critical Environmental Concern

Legend

- Yellow box: Bureau of Land Management
- White box: Private
- Blue box: State
- Thick black line: Primary Road Paved
- Thin black line: Secondary Road Paved
- Dashed black line: Primary Road Unpaved
- Dashed black line: Secondary Road Unpaved
- Dotted black line: Tertiary Road Unpaved
- Thin grey line: Single Track
- Thin grey line: Reclaiming
- Thick black line: State Boundary

LOCATION MAP

Projection: Universal Transverse Mercator
 Datum: North American 1983
 Map Scale: 1:50,000
 Created By: Arizona Strip GIS Team
 Created On: July 2010

Figure 2.3-1. Alternative B for Littlefield Sub-region

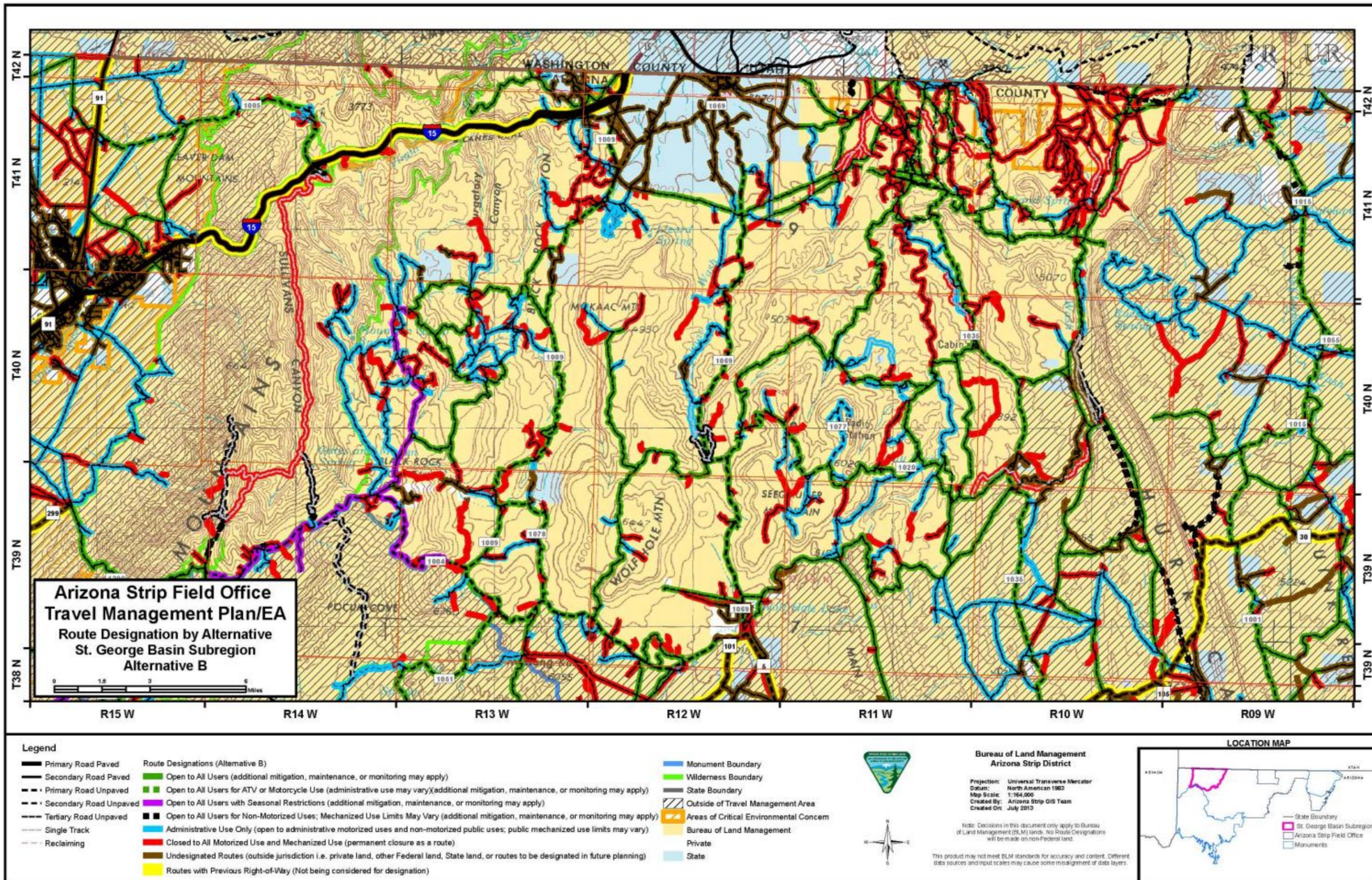


Figure 2.3-2. Alternative B for St George Basin Sub-region

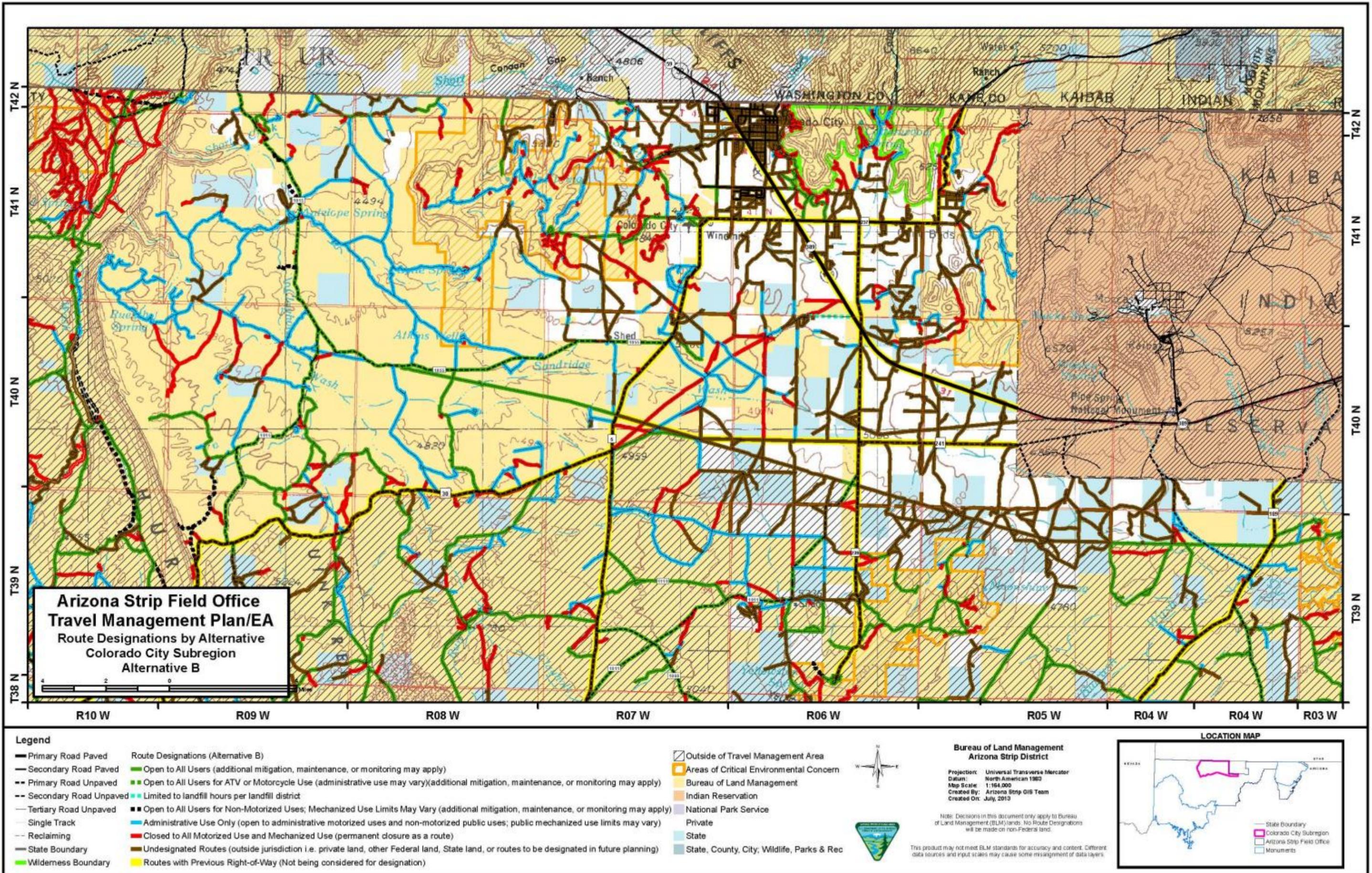
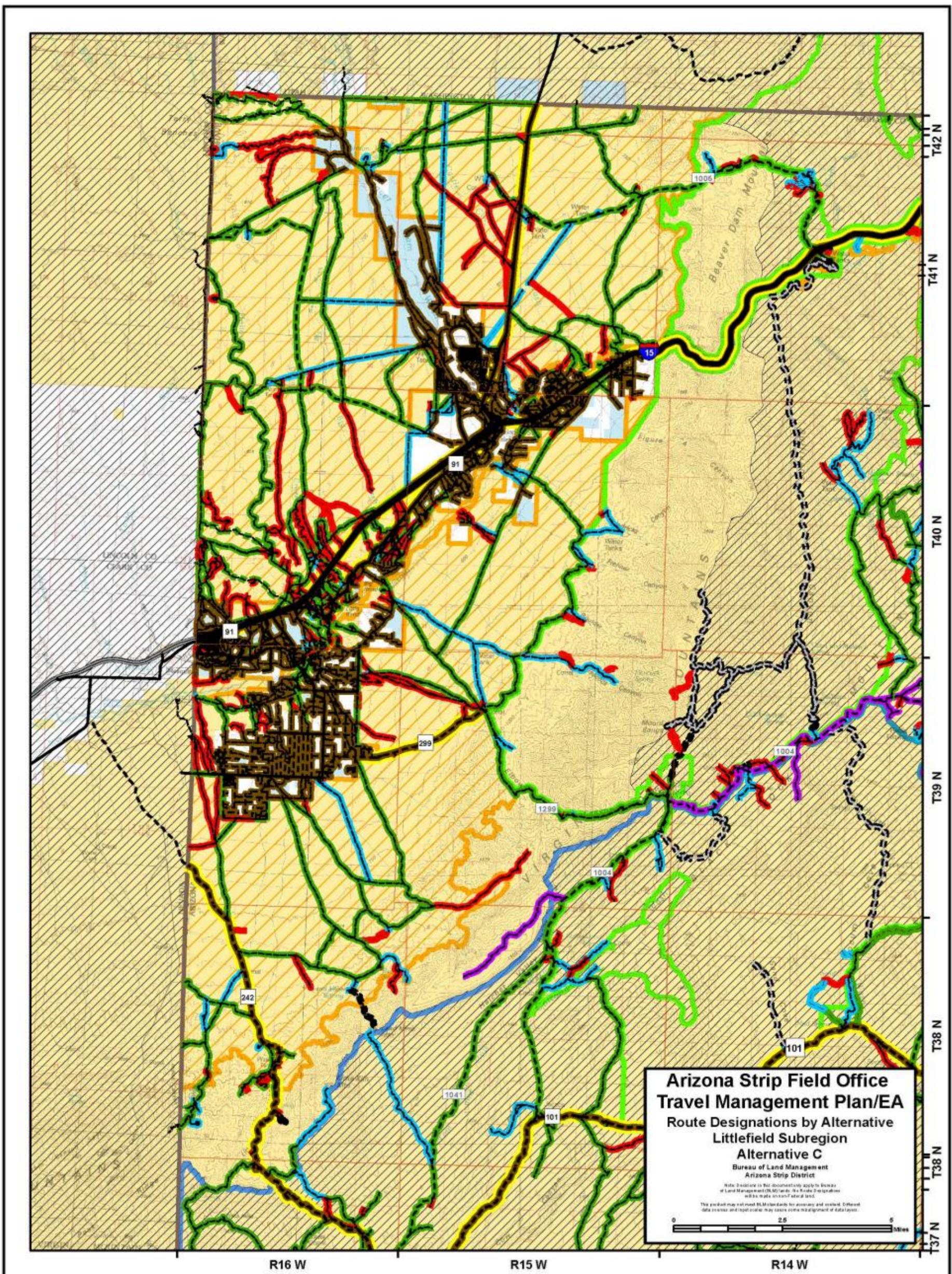


Figure 2.3-3. Alternative B for Colorado City Sub-region

2.4 ALTERNATIVE C – PROPOSED ACTION

Recognizing the popularity of motorized and non-motorized travel, Alternative C (Proposed Action) provides opportunities for motorized and non-motorized travel while balancing the protection of natural and cultural resources (see Figures 2.4-1 – 2.4-3). Through a reduction in the number and miles of routes, impacts to natural and cultural resources would be reduced. The route designations under this alternative are displayed in Table 2.3.

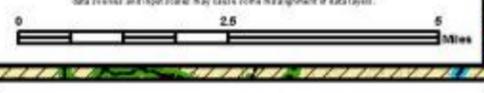
Table 2.3. Route Designations – Alternative C (Proposed Action)		
Designation	Number of Miles	Percent of Miles
<i>Littlefield Sub-region</i>		
Open to all users	218.8	51%
Limited to ATV or motorcycle use	11.5	2%
Limited to all users with seasonal restrictions	3.1	1%
Limited to authorized uses	49.9	12%
Limited to non-motorized use	3.7	1%
Closed to all motorized and mechanized use	141.3	33%
Total	428.3	100%
<i>St. George Basin Sub-region</i>		
Open to all users	351.8	50%
Limited to ATV or motorcycle use	84.0	12%
Limited to all users with seasonal restrictions	21.4	3%
Limited to authorized uses	69.0	10%
Limited to Modified 4WD use	8.4	1%
Limited to non-motorized use	31.7	4%
Closed to all motorized and mechanized use	143.8	20%
Total	710.1	100%
<i>Colorado City Sub-region</i>		
Open to all users	250.4	65%
Limited to ATV or motorcycle use	0.8	<1%
Limited to landfill open hours	1.6	<1%
Limited to authorized uses	73.9	19%
Limited to non-motorized use	1.3	<1%
Closed to all motorized and mechanized use	56.7	15%
Total	384.7	100%



**Arizona Strip Field Office
Travel Management Plan/EA
Route Designations by Alternative
Littlefield Subregion
Alternative C**
Bureau of Land Management
Arizona Strip District

Note: Provisions in this document apply to Bureau of Land Management (BLM) lands. No State Designation will be made on non-Federal land.

This product may not meet BLM standards for accuracy and content. Different data sources and input order may cause some misalignment of data layers.



- Route Designations (Alternative C)**
- █ Open to All Users (additional mitigation, maintenance, or monitoring may apply)
 - █ Open to All Users for ATV or Motorcycle Use (administrative use may vary)(additional mitigation, maintenance, or monitoring may apply)
 - █ Open to All Users with Seasonal Restrictions (additional mitigation, maintenance, or monitoring may apply)
 - █ Open to All Users for Non-Motorized Uses; Mechanized Use Limits May Vary (additional mitigation, maintenance, or monitoring may apply)
 - █ Administrative Use Only (open to administrative motorized uses and non-motorized public uses; public mechanized use limits may vary)
 - █ Closed to All Motorized Use and Mechanized Use (permanent closure as a route)
 - █ Undesignated Routes (outside jurisdiction i.e. private land, other Federal land, State land, or routes to be designated in future planning)
 - █ Routes with Previous Right-of-Way (Not being considered for designation)
 - █ Monument Boundary
 - █ Wilderness Boundary
 - Outside of Travel Management Area
 - Areas of Critical Environmental Concern

- Bureau of Land Management
- Private
- State
- Primary Road Paved
- Secondary Road Paved
- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- Single Track
- Reclaiming
- State Boundary



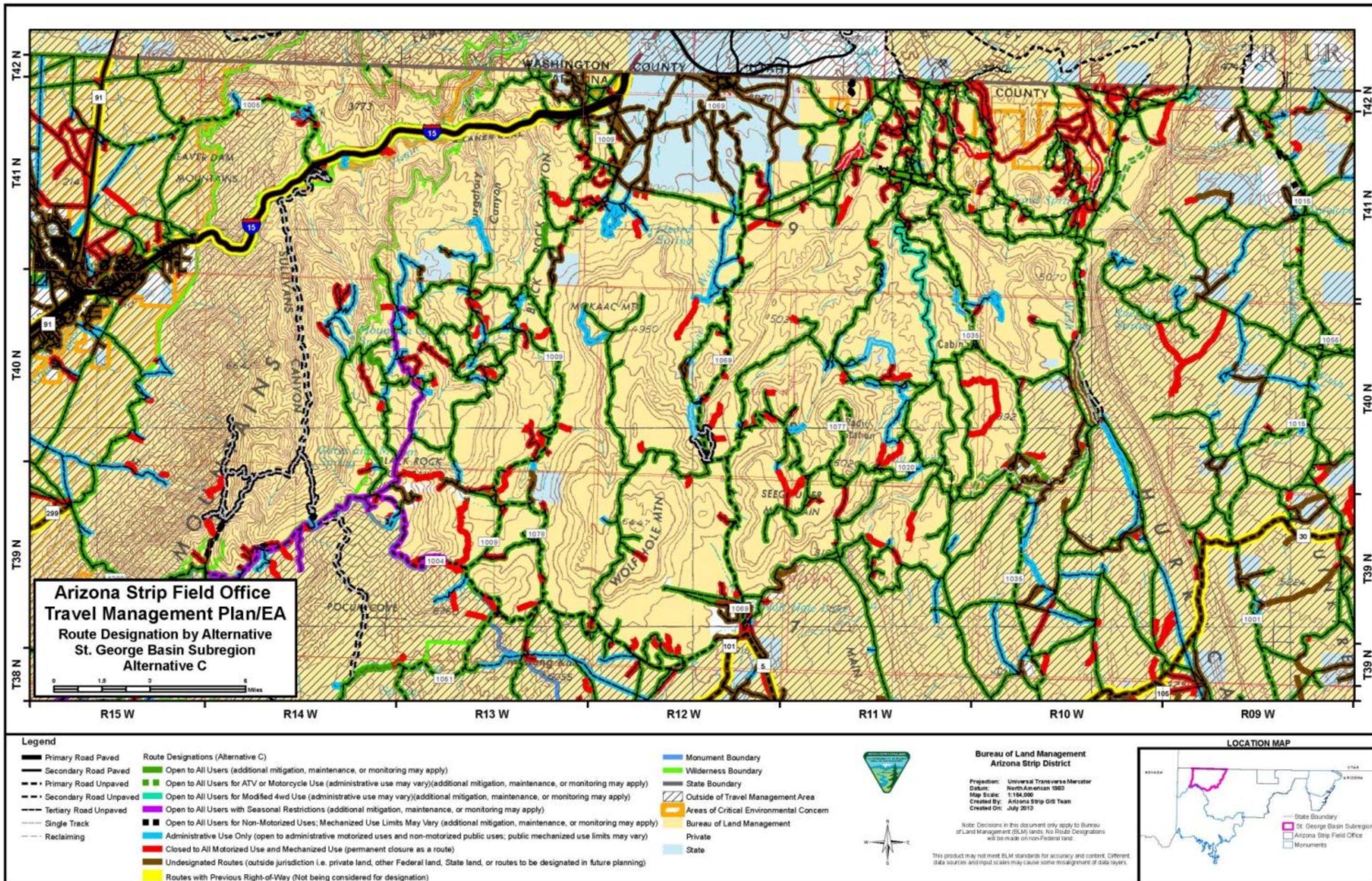


Figure 2.4-2. Alternative C for St George Basin Sub-region

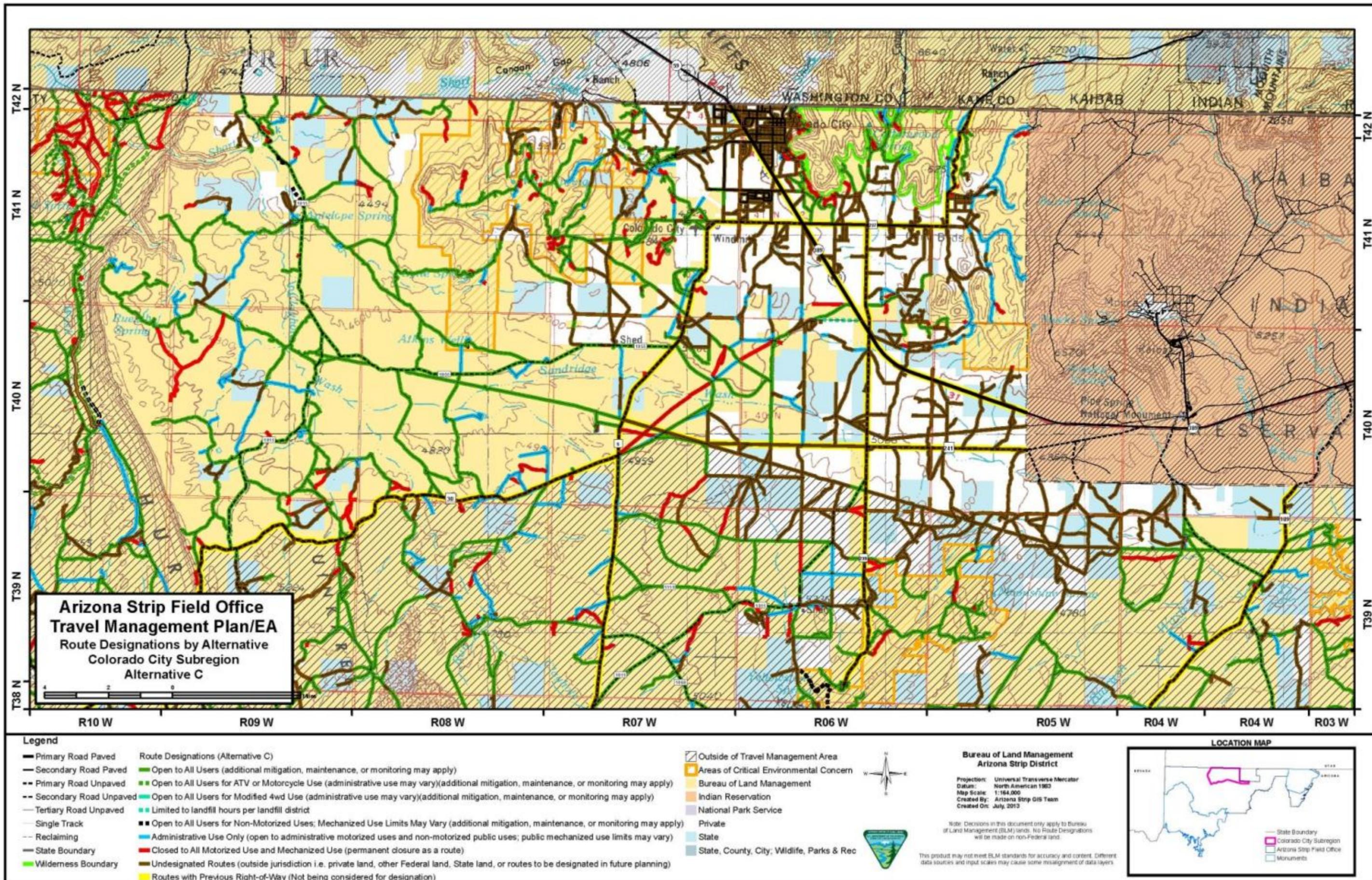
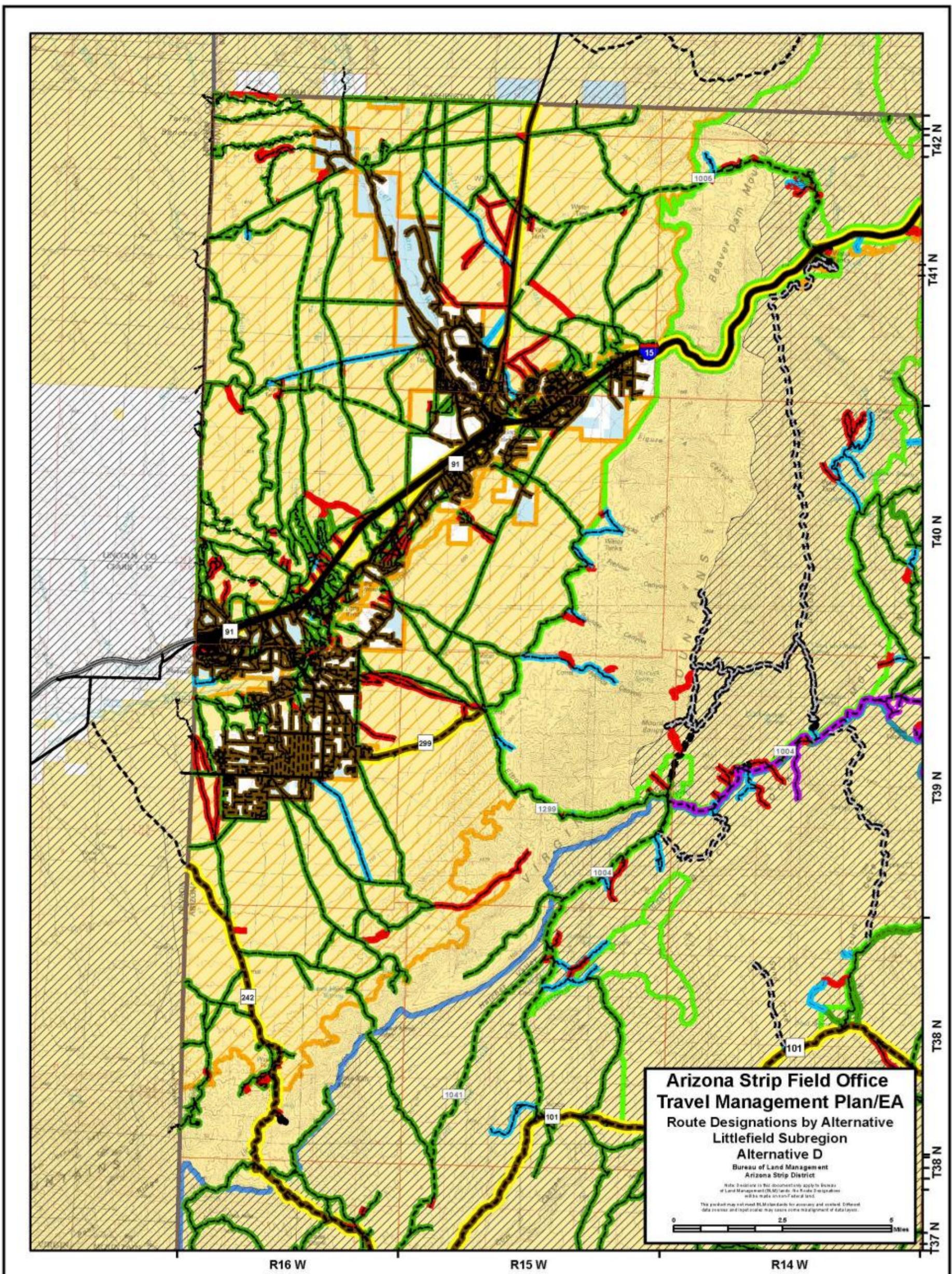


Figure 2.4-3. Alternative C for Colorado City Sub-region

2.5 ALTERNATIVE D

Alternative D would provide the most designated routes of the three action alternatives (see Figures 2.5-1 – 2.5-3). This alternative would therefore allow the most motorized public access. The network of OHV travel routes would focus use on designated roads and trails with the intent of reducing route proliferation and protecting sensitive resources. The route designations under this alternative are displayed in Table 2.4.

Table 2.4. Route Designations – Alternative D		
Designation	Number of Miles	Percent of Miles
<i>Littlefield Sub-region</i>		
Open to all users	306.0	71%
Limited to ATV or motorcycle use	21.0	5%
Limited to authorized uses	22.6	5%
Limited to non-motorized use	2.6	1%
Closed to all motorized and mechanized use	76.1	18%
Total	428.3	100%
<i>St. George Basin Sub-region</i>		
Open to all users	431.5	61%
Limited to ATV or motorcycle use	114.0	16%
Limited to all users with seasonal restrictions	15.1	2%
Limited to authorized uses	49.1	7%
Limited to Modified 4WD use	7.1	1%
Limited to non-motorized use	31.2	4%
Closed to all motorized and mechanized use	62.1	9%
Total	710.1	100%
<i>Colorado City Sub-region</i>		
Open to all users	321.1	83%
Limited to ATV or motorcycle use	0.8	<1%
Limited to landfill open hours	1.6	<1%
Limited to authorized uses	33.8	9%
Limited to non-motorized use	1.3	<1%
Closed to all motorized and mechanized use	26.1	7%
Total	384.7	100%



**Arizona Strip Field Office
Travel Management Plan/EA
Route Designations by Alternative
Littlefield Subregion
Alternative D**
Bureau of Land Management
Arizona Strip District

Note: Provisions in this document apply to Bureau of Land Management (BLM) lands. No State Designation will be made on non-Federal land.

This product may not meet BLM standards for accuracy and content. Different data sources and input order may cause some misalignment of data layers.

0 2.5 5 Miles

<p>Route Designations (Alternative D)</p> <ul style="list-style-type: none"> █ Open to All Users (additional mitigation, maintenance, or monitoring may apply) ▨ Open to All Users for ATV or Motorcycle Use (administrative use may vary)(additional mitigation, maintenance, or monitoring may apply) █ Open to All Users with Seasonal Restrictions (additional mitigation, maintenance, or monitoring may apply) █ Open to All Users for Non-Motorized Uses; Mechanized Use Limits May Vary (additional mitigation, maintenance, or monitoring may apply) █ Administrative Use Only (open to administrative motorized uses and non-motorized public uses; public mechanized use limits may vary) █ Closed to All Motorized Use and Mechanized Use (permanent closure as a route) █ Undesignated Routes (outside jurisdiction i.e. private land, other Federal land, State land, or routes to be designated in future planning) █ Routes with Previous Right-of-Way (Not being considered for designation) █ Monument Boundary █ Wilderness Boundary Outside of Travel Management Area Areas of Critical Environmental Concern 	<ul style="list-style-type: none"> Bureau of Land Management Private State Primary Road Paved Secondary Road Paved Primary Road Unpaved Secondary Road Unpaved Tertiary Road Unpaved Single Track Reclaiming State Boundary 	<p>LOCATION MAP</p> <p> <ul style="list-style-type: none"> State Boundary Littlefield Subregion Arizona Strip Field Office Monuments </p> <p><small>Projection: Universal Transverse Mercator Datum: North American 1983 Map Scale: 1:50,000 Created By: Arizona Strip GIS Team Created On: July 2010</small></p>
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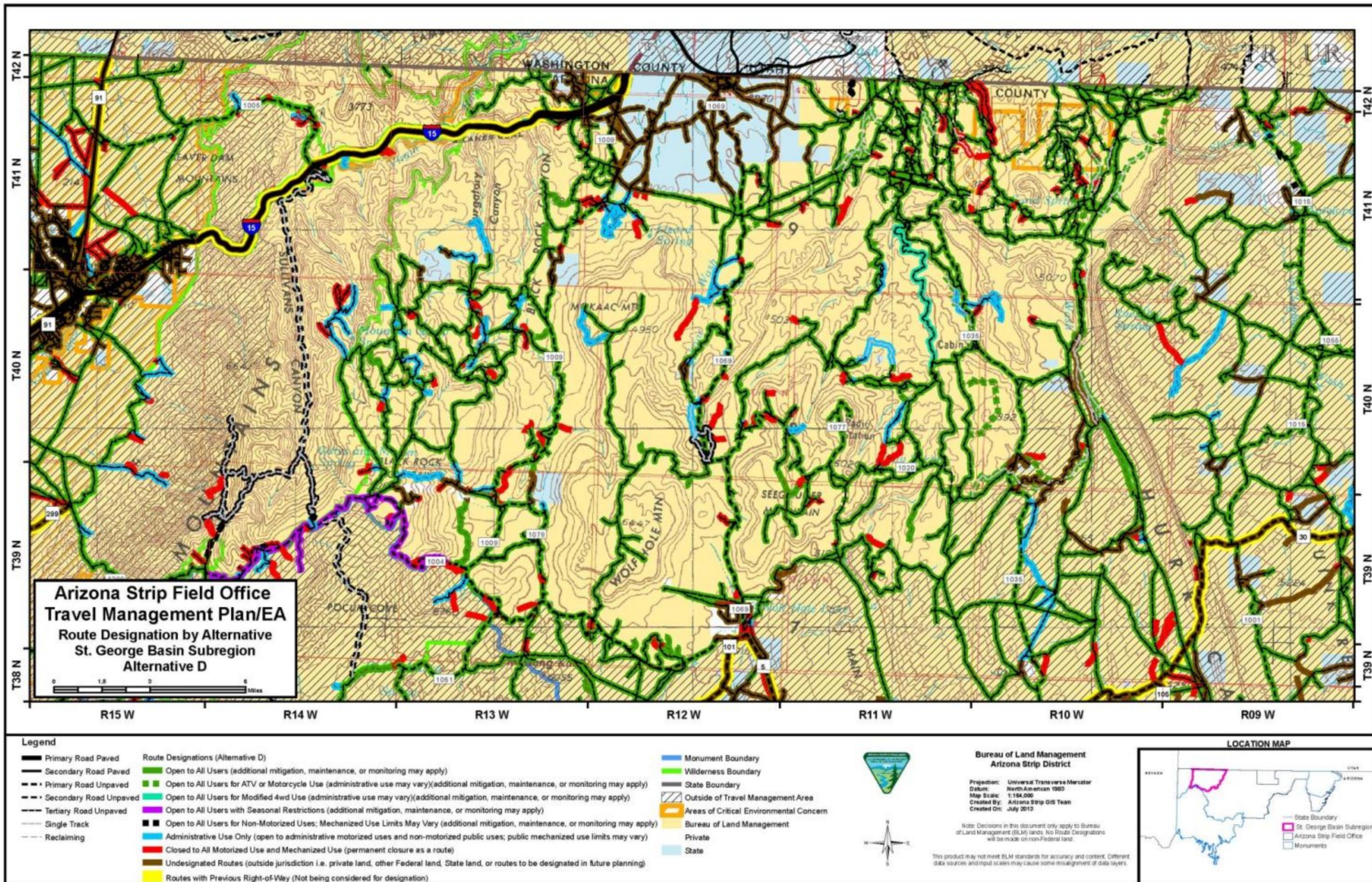


Figure 2.5-2. Alternative D for St George Basin Sub-region

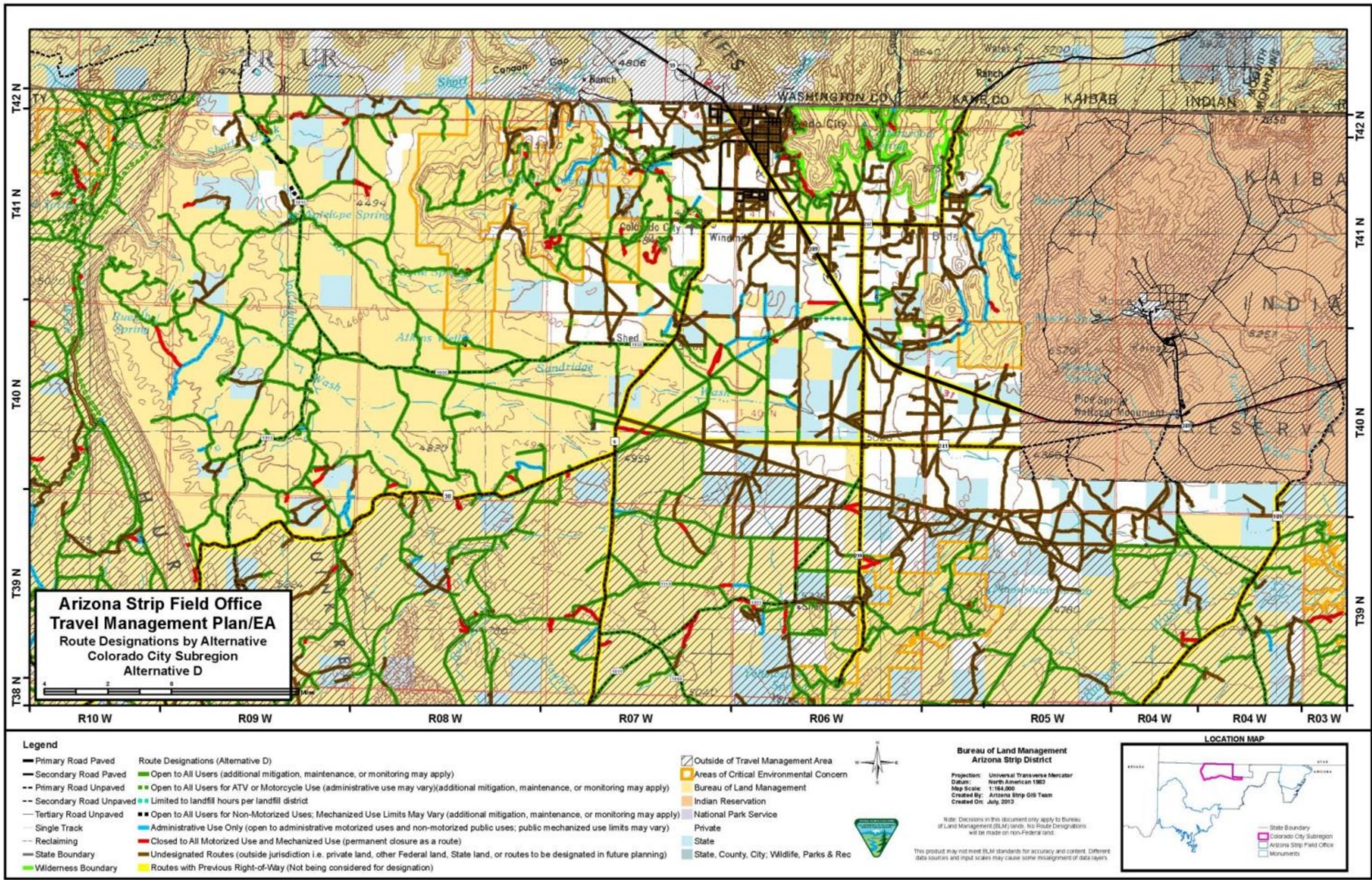


Figure 2.5-3. Alternative D for Colorado City Sub-region

Chapter 3

AFFECTED ENVIRONMENT

The purpose of this chapter is to describe the existing environment potentially affected by the alternatives.

3.1 GENERAL SETTING

The analysis area consists of approximately 652,500 total acres, 534,000 acres of which are BLM-administered public lands (see Table 3.1).

Table 3.1. Acres by Surface Ownership		
Sub-region	Surface Ownership	Acres
<i>Littlefield</i>	BLM	139,460
	Private	13,553
	State	6,133
	Total Acres within Sub-region	159,146
<i>St. George Basin</i>	BLM	245,094
	Private	1,479
	State	16,000
	Total Acres within Sub-region	262,576
<i>Colorado City</i>	BLM	149,521
	Private	53,881
	State	27,353
	Total Acres within Sub-region	230,755

Littlefield Sub-region

The Littlefield Sub-region is located in the northwestern portion of the Arizona Strip Field Office. This sub-region extends north to Utah, west to Nevada, south to Grand Canyon-Parashant National Monument, and east to the Virgin Ridge of the Virgin Mountains. Portions of the Beaver Dam Mountains Wilderness and Paiute Wilderness occur within this sub-region. The Interstate 15 corridor which travels through the Virgin River Gorge, is also within the Littlefield Sub-region.

Elevation ranges from approximately 1,700 feet (along the Virgin River) to over 8,000 feet (the summit of Mount Bangs, which is the highest peak on the Arizona Strip). Topography in the majority of the sub-region (at the lower elevations) is relatively flat except for Beaver Dam Wash (which runs south from Utah to the Virgin River at the community of Beaver Dam), numerous washes of varying sizes, and large alluvial fans at the base of the Beaver Dam and Virgin mountains. The eastern portion of the sub-region consists of desert mountains with big basins, gorges, and washes, the largest of which is the Virgin River Gorge. This gorge is a spectacular canyon carved out of the Virgin Mountains by the Virgin River. Drainage patterns within this sub-region are well defined, with all surface runoff draining south to the Virgin River.

The substantial elevation change within this sub-region creates a land of contrasts including several ecological zones and plant communities ranging from the hot Mojave Desert through stands of pinyon pine and juniper to ponderosa pine and Douglas fir on the cooler north-facing slopes at the highest elevations.

St. George Basin Sub-region

The St. George Basin Sub-region extends north to Utah, west to the Virgin Ridge of the Virgin Mountains, south to Grand Canyon-Parashant National Monument, and east to the Hurricane Cliffs. Portions of the Beaver Dam Mountains Wilderness and Paiute Wilderness also occur within this sub-region.

Elevation ranges from approximately 2,000 feet (along the Virgin River in the Virgin River Gorge) to over 8,000 feet on the summit of Mount Bangs (the boundary of Littlefield and St. George Basin sub-regions runs along the crest of the Virgin Mountains). Topography in the sub-region is quite varied, with desert mountains (which include big basins, gorges, and washes) on the west; rolling basaltic alluvium flats cut by numerous small drainages; large washes (Fort Pearce Wash in the northern part of the sub-region, and Hurricane Wash in the south); and a basalt plateau known as Wolf Hole Mountain. Other major topographical features of the sub-region include Dutchman Draw, Quail Hill, Seegmiller Mountain, Low Mountain, Black Rock Mountain, East Mesa, and Wolf Hole Valley. Drainage patterns within this sub-region are well defined, with all surface runoff draining north to the Virgin River.

The northern portion of this sub-region (at the lower elevations) is warm and arid, and consists of a low desert vegetation community characterized by a mix of desert shrubs and grasses. Dominant shrubs include Joshua tree, creosotebush, ratany, yucca, blackbrush, white bursage, winterfat, and various cactus species. Higher elevation parts of the sub-region are characterized by Utah juniper and pinyon pine, with scattered ponderosa pine on Black Rock Mountain. There are also some areas of sagebrush with an understory of grasses in the higher valleys and rolling hills and draws.

Colorado City Sub-region

The Colorado City Sub-region is located east of the Hurricane Cliffs and extends north to Utah, south to the Uinkaret Plateau, Upper Clayhole Valley and Yellowstone Mesa, and east to the Kaibab Paiute Reservation.

Elevation ranges from approximately 3,400 feet (in Rock Canyon) to approximately 6,400 feet (in the Cottonwood Point Wilderness). Topography in the majority of the sub-region is relatively flat with numerous washes of varying sizes, such as Short Creek and Clayhole Wash, which drain west toward the Hurricane Cliffs. The northern and northeastern parts of the sub-region contain colorful sandstone buttes and mesas, the largest of which is Lost Spring Mountain which dominates the area west of Colorado City. The area north of Highway 389 (the northeastern corner of the sub-region) includes many rugged buttes that extend north into Utah and east into the Kaibab Paiute Reservation. The Cottonwood Point Wilderness is located entirely within this sub-region.

The lower elevation parts of the sub-region consist of a desert grassland vegetation community in the areas around Lost Spring Mountain, transitioning to a mixed shrub community in Upper Clayhole Valley. The top of Lost Spring Mountain (as well as Cottonwood Point, Lyons Point, and Lone Butte) consist primarily of sagebrush (along with other shrubs), a variety of perennial grasses, and some scattered junipers.

3.2 ELEMENTS/RESOURCES OF THE HUMAN ENVIRONMENT

The BLM is required to consider many authorities when evaluating a Federal action. Those elements of the human environment that are subject to the requirements specified in statute, regulation, or executive order, and must be considered in all EAs (BLM 2008b) have been considered by BLM resource specialists to determine whether they would be potentially affected by the proposed action. These elements are identified in Table 3.2, along with the rationale for determination of potential effects. If any element was determined to be potentially impacted, it was carried forward for detailed analysis in this EA; if an element is not present or would not be affected, it was not carried forward for analysis. Table 3.2 also contains other resources/concerns that have been considered in this EA. As with the elements of the human environment, if these resources were determined to be potentially affected, they were carried forward for detailed analysis in this document.

Table 3.2. Summary Evaluation of Elements/Resources of the Human Environment

Resource	Determination*	Rationale for Determination
<p>* NP = Not present in the area that will be impacted by any of the alternatives. NI = Present, but not affected to a degree that would mean detailed analysis is required. PI = Present with potential for impact; analyzed in detail in the EA.</p>		
Air Quality	PI	Vehicular travel on unpaved roads creates fugitive dust. The various alternatives analyzed in this EA propose different designated route networks, with the majority of routes open to motorized vehicles. Fugitive dust would therefore be created, which could affect localized visibility. This issue is therefore carried forward for detailed analysis.
Areas of Critical Environmental Concern	NI	<p>There are 8 Areas of Critical Environmental Concern (ACECs) within the planning area:</p> <ul style="list-style-type: none"> • Beaver Dam Slope ACEC • Virgin River ACEC • Virgin Slope ACEC • Black Knolls ACEC • Little Black Mountain ACEC • Ft. Pearce ACEC • Lost Spring Mountain ACEC • Lone Butte ACEC <p>Developing a defined travel management network of designated routes within the planning area would not affect the designations of these ACECs (i.e., the relevant and important values for which they were designated would still be present), nor would it affect the management prescriptions identified for each ACEC.</p> <p><i>(Please note that the individual resources for which each ACEC was designated are separately evaluated/analyzed in this EA.)</i></p>
Cultural Resources	PI	Potential disturbances to, and management of, cultural resources are affected by access and route designation. This issue is therefore carried forward for detailed analysis.
Environmental Justice	NI	The proposed action would have no disproportionately high or adverse human health or other environmental effects on minority or low-income segments of the population. The proposed action would also have no effect on low-income or minority populations.
Farmlands (Prime or Unique)	NP	There are no prime or unique farmlands in the area.
Floodplains	NI	No actions are proposed that would result in permanent fills or diversions, or placement of permanent facilities, in floodplains or special flood or hazard areas. In addition, the alternatives would not affect the function of the floodplains within the planning area.

Resource	Determination*	Rationale for Determination
Invasive, Non-native Species (including Noxious Weeds)	PI	Use of designated routes would involve vehicular (motorized/mechanized) and non-motorized travel on designated routes/trails. Infestation of invasive species may occur from this vehicular travel along the designated route network. However, treatment of existing weed infestations is facilitated by access to these infestation sites. This issue is therefore carried forward for detailed analysis (this issue is addressed under the "Vegetation" discussion).
Native American Religious Concerns	NI	During coordination with American Indian Tribes who claim cultural affiliation to the Arizona Strip about this TMP and the potential route designations, no Native American concerns were identified.
Special Status (threatened, endangered, candidate, and sensitive) Species	PI	Roads affect special status species (both plants and animals) by fragmenting habitat; reducing available habitat for breeding and foraging activities; causing injury to individual plants from crushing or removal and loss or modification of habitat; and increasing opportunities for vehicle collisions and a variety of other disturbances that change wildlife movement and habitat use. This issue is therefore carried forward for detailed analysis.
Wastes (hazardous or solid)	NP	No known hazardous or solid waste issues occur in the planning area.
Water Quality (drinking/ground)	NI	Runoff from routes could carry some sediment into drainages and eventually further downstream to the Virgin River, very slightly adding to its turbidity. Runoff from roads on saline soils could very slightly increase the salt loading to the Virgin River. However, these amounts are very minor and would not affect drinking or ground water quality to any noticeable degree.
Wetlands/Riparian Zones	PI	Impacts to riparian resources, including reduced biological and hydrological function, could occur from vehicles traveling on routes within riparian areas. Closure and rehabilitation of routes could also affect riparian resources in both the short-term (from the rehabilitation process) and long-term as vegetation becomes reestablished. This issue is therefore carried forward for detailed analysis.
Wild and Scenic Rivers	NI	Developing a defined travel management network of designated routes within the planning area would not affect the potentially eligible wild and scenic river segments of the Virgin River (i.e., the outstandingly remarkable values). In addition, the characteristics that established the potential classifications (as identified in the Arizona Strip Field Office RMP) will be preserved. This includes access to the river in the recreational segments (from the Cedar Pockets Campground downstream to the Nevada state line). <i>(Please note that recreational access is evaluated/analyzed in the "Recreation" section of this EA.)</i>
Wilderness	NI	No motorized routes would be designated in wilderness. Designation of non-motorized routes in wilderness would not impact naturalness or opportunities for primitive recreation and solitude.
Livestock Grazing	NI	Active grazing allotments occur throughout the Littlefield, St. George Basin, and Colorado City sub-regions. Developing a defined travel management network of designated routes within the planning area would not affect permit holders' ability to access their allotments or any range improvements located therein. Performance of activities authorized by the grazing permits would therefore not be impacted by any of the alternatives.
Woodland/Forestry	NI	Developing a defined travel management network of designated routes within the planning area would not affect the availability of, or access to, these resources because none of the alternatives would close any areas to collection of woodland products.
Vegetation	PI	Disturbance to vegetation could occur during route realignment or construction, including the potential loss of shrubs, grasses, and forbs. Disturbance to vegetation also occurs indirectly by dust accumulation immediately adjacent to roads. Invasive species may also be spread by vehicular travel along roads. This issue is therefore carried forward for detailed analysis.
Wildlife (including big game and migratory birds)	PI	Wildlife species, including big game and migratory birds, could be impacted by roads in a variety of ways including habitat alteration, behavioral changes, and disturbance from vehicles. This issue is therefore carried forward for detailed analysis.

Resource	Determination*	Rationale for Determination
Soils	PI	Roads impact soils via blading, compaction, organic cover reduction, rutting, and increased water runoff and wind erosion.
Recreation	PI	Route designation could impact recreational access and use in these sub-regions through limiting or providing opportunities for a variety of recreational activities. This issue is therefore carried forward for detailed analysis.
Visual Resources	NI	Developing a defined travel management network of designated routes within the planning area would not impact visual resources because there would be no changes in line, form, texture or contrast to the characteristic landscape in the three sub-regions from designation of routes. New route construction is not part of the proposed action or other alternatives.
Geology/Mineral Resources/Energy Production	NI	Developing a defined travel management network of designated routes within the planning area would not affect geology, mineral resources, or energy production because none of the alternatives would close any areas to mineral development and would not alter any known geologic features.
Paleontology	NI	The majority of Paleontological resources within the planning area are abundant non-vertebrate fossils, usually occurring in geological formations, and unlikely to be adversely affected by actions proposed under any of the alternatives.
Lands/Access	NI	Many land use authorizations, which include access roads for operation and maintenance purposes exist in all three of the sub-regions. None of these land use authorizations would be impacted as a result of the proposed TMP – holders would still be able to access their authorized use areas for operation and maintenance activities as provided in their authorization. In addition, right-of-way applications for access to private/state inholdings would be evaluation and processed according to established policies and regulations, resulting in no change from current procedures and no access issues as a result of this TMP.
Fuels/Fire Management	NI	No hazardous fuels reduction or fuels management projects are proposed for these areas. Developing a defined travel management network of designated routes within the planning area would not affect fire management because non-emergency activities would be designed around the designated network; emergency activities (i.e., wildland fire suppression) could involve cross-country travel (as allowed by the Arizona Strip Field Office RMP).
Socioeconomic Values	NI	<p>The economic base of the Arizona Strip is mainly ranching with a few gypsum mines and uranium operations. Nearby communities are supported by tourism (including outdoor recreation), construction, and light industry. The social aspect involves remote, unpopulated settings with moderate to high opportunities for solitude.</p> <p>Developing a defined travel management network of designated routes within the planning area could affect some local tour operators if route(s) to particular areas/destinations were not provided (i.e., existing routes were closed). However, the alternatives would have no overall effect on the economy of the area since all alternatives provide some degree of access to the public lands within the planning area and existing permit/right-of-way/lease holders and mining operators would still be able to access their authorized operation areas.</p>
Wild Horses and Burros	NP	There are no wild horses or burros, or habitat management areas, in the planning area.
Wilderness Characteristics	PI	There are several existing roads that occur within the Lime Kiln Mountain and Virgin Peak Ridge areas managed to maintain wilderness characteristics. Use of designated routes within these areas could affect the wilderness characteristics of naturalness, opportunities for solitude, and opportunities for primitive and unconfined recreation. This issue is therefore carried forward for detailed analysis.

3.3 RESOURCES BROUGHT FORWARD FOR ANALYSIS

3.3.1 Air Quality

The Clean Air Act (CAA), as amended, establishes National Ambient Air Quality Standards (NAAQS). The Arizona Department of Environmental Quality is the regulating and enforcing agency for Arizona air quality standards and has adopted these Federal standards as the Arizona Ambient Air Quality Standards. Geographic areas (commonly referred to as airsheds) are designated attainment, non-attainment, or unclassified for ambient air quality and pollutant emission sources. Areas in which levels of a pollutant measure below the NAAQS are designated “attainment” areas; areas that exceed the NAAQS may be designated “non-attainment” – these are usually urban regions and/or regions with higher density industrial development. The given status of an area is designated separately for each pollutant.

The entire planning area is unclassified for all pollutants and has been designated as Prevention of Significant Deterioration (PSD) Class II. The CAA established programs and permitting processes designed to protect and improve air quality. Section 176(c) (1) contains the language that mandates the general conformity rule. The Environmental Protection Agency promulgated PSD regulations to protect and enhance air quality. PSD review is a pollutant-specific review and a federally mandated program. This PSD review applies to new emission sources in areas designated attainment or unclassified, and it applies only to pollutants for which a project is considered a potential major contributor. The PSD provisions use an incremental approach and are intended to help maintain good air quality in areas that attain the NAAQS and to provide special protections for areas of special natural recreational, scenic, or historic value, such as national parks and wildlife areas. PSD permits are required for major new stationary sources of emissions that emit 250 tons (100 tons for categorical sources) or more per year of an air pollutant. The actions proposed in this EA do not trigger the requirements of the PSD review process.

Air quality in the planning area is generally good. Exceptions include short-term pollution (particulate matter) resulting from vehicular traffic on unpaved roads. Fugitive dust is also generated by winds blowing across the area, coming from roads and other disturbed areas.

3.3.2 Cultural Resources

A detailed description of the cultural resources of the Arizona Strip can be found in “Man, Models and Management – An Overview of the Archaeology of the Arizona Strip and the Management of its Cultural Resources” (an electronic version can be viewed at <http://www.grandcanyontrust.org/kane/kvcha-library.php>). This report contains an overview of the prehistory and history of the Arizona Strip, and deals with the sites that make up this record and ultimately the management of these resources (Altschul and Fairley 1989). More up-to-date information on the cultural resources of this area can also be found in the Proposed RMP/Final EIS for the Arizona Strip District (BLM 2007).

Cultural resources in the Littlefield, St. George Basin and Colorado City sub-regions range from lithic or artifact scatters to large villages and historic structures. Types and densities of cultural resources vary depending on the environmental zone in which they are located. Areas near water (i.e., rivers or springs) or other resources critical for human survival, such as pinyon-juniper forests, plant resources, or lithic resources that provided food, shelter, or cryptocrystalline rock that could be used for tools usually contain the densest array of archaeological sites, although sites can be located many miles away from these resources as well.

Two ACECs within the planning area were designated for the protection of cultural resources: Little Black Mountain ACEC and Lost Spring Mountain ACEC. Little Black Mountain ACEC was designated to protect a regionally important rock art site and to interpret this site for the public. The site is at the southern base of Little Black Mountain, a prominent mountain in St. George Basin, and is fenced to protect the site from motorized or mechanized vehicle intrusion and impacts. The site has developed trails and interpretive signs, a designated parking area, picnic tables, and toilet. Lost Spring Mountain ACEC is a low flat-topped mesa containing pinyon-juniper forests, close access to local springs, access to nearby farming areas, and vistas of surrounding geography. This ACEC contains a wide range of cultural resources including rock art, villages, artifact scatters, resource gathering areas, and historic structures and features.

Historic trails and roads, including the Old Spanish National Historic Trail, the Old Mormon Wagon Road to California, the Arrowhead Highway (early automobile route), the Jedediah Smith Trail, the Dominguez-Escalante Trail, the Temple Trail, and the Honeymoon Trail are also within the planning area.

The overall condition of the cultural resources in the planning area is good. A moderate percentage of the properties under the BLM's management have been disturbed by natural forces such as fire, animal burrowing, erosion and weathering, but a large portion of the disturbance to cultural resources is due to illegal human looting and vandalism because of the proximity of the planning area to local communities. Selected sites are monitored by public volunteers of the Arizona State Parks Site Steward Program and BLM personnel (including law enforcement officers).

Resources of Traditional Importance to American Indians

Resources of traditional importance to American Indians occur in the planning area, including traditional homelands (Southern Paiute, Hopi), archaeological sites including trails, vegetation, wildlife, special status species, water, geographic areas, and prominent features of the landscape. Even though the entire planning area is considered traditional homelands by American Indians, the Colorado City Sub-region directly borders the Kaibab Paiute Reservation on its western and southern sides. The Shivwits Reservation (Paiute) in Utah is located approximately nine miles north of both the Littlefield and St. George Basin sub-regions.

3.3 Recreation

General Management

Recreation activities occurring throughout the planning area involve a broad spectrum of recreational pursuits ranging from dispersed and casual recreation to organized, BLM-authorized group or commercial uses. Typical recreation in the region includes OHV driving, scenic driving, hunting, hiking, wildlife viewing, horseback riding, rock climbing, camping, backpacking, mountain biking, geocaching, picnicking, night-sky viewing, nature study, and photography. The Arizona Strip is known for its large-scale undeveloped areas and remoteness, which provides an array of recreational opportunities for users who wish to experience primitive and undeveloped recreation, as well as those seeking more organized or packaged recreation experiences.

Recreational Settings

The Littlefield, St. George Basin and Colorado City sub-regions are primarily managed as part of the Arizona Strip Extensive Recreation Management Area (ERMA). The ERMA receives only custodial management regarding visitor health and safety, user conflict and resource protection issues, with no

activity level planning. In the ERMA, regulation of visitor use would occur only when monitoring indicates a trend towards unacceptable change to desired recreational settings brought about by such use. The planning area does contain three areas that have been identified as Special Recreation Management Area (SRMAs). SRMA delineation intensifies management of areas where outdoor recreation is a high priority. It helps direct recreation program priorities toward areas with high resource values, elevated public concern, or significant amounts of recreational activity. The three SRMAs within the planning area are:

- Virgin River SRMA (adjacent to the Virgin River, within the Littlefield Sub-region);
- the Virgin Ridge SRMA (in the Virgin Mountains outside designated wilderness – the southwestern portion of the Littlefield Sub-region); and
- St George Basin SRMA – encompasses the northern two-thirds of the St. George Basin Sub-region and extends into the northwestern edge of the Colorado City Sub-region (in Rock and Cottonwood canyons).

The primary strategy for the Virgin River SRMA is to target a demonstrated destination recreation-tourism market demand from mainly local community residents and regional visitors for day-use and overnight hiking, family outings, rock climbing, school group field outings, and white water activities. Similarly, there is market demand from local, regional, and national visitors for sightseeing, appreciation of geologic resources, rest from travel and escaping the cold winter weather of other locations. This demand is supported by the area's distinctive location along high traffic volume Interstate Highway 15, its place in the Grand Canyon-like landscape of Virgin River Gorge, and ease of access for day and overnight recreation. National, regional, and local recreation-tourism visitors value these public lands as recreation-tourism destinations. Within this SRMA, the Virgin River Recreation Management Zone (RMZ) is managed for group-oriented white-water and climbing adventures amidst rugged and stunning geologic features.

The primary strategy for the Virgin Ridge SRMA is to target a demonstrated community recreation-tourism market demand from primarily local communities (dependent on public lands recreation and/or related tourism use, growth, and/or development), as well as some other regional visitors, for motorized/mechanized/ non-mechanized exploring, world-class rock climbing, and guided touring in close-to-town natural settings. This demand is supported by the area's distinctive landscape, its close proximity to the rapidly growing communities of Mesquite, Bunkerville, Logandale, and Overton, Nevada and Beaver Dam, Scenic, and Littlefield, Arizona. Local recreation-tourism visitors value these public lands as their own 'back-yard' recreation settings. Within the Virgin Ridge SRMA is the Virgin Ridge RMZ, managed for self-directed, rugged, adventure in a natural setting close to town with opportunities for scenic natural and historic appreciation. Activities in this RMZ could include hiking, scrambling, equestrian, hunting, OHV exploring, and mountain bike riding.

The primary strategy for the St. George Basin SRMA is to target a demonstrated community recreation-tourism market demand from primarily local communities (dependent on public lands recreation and/or related tourism use, growth, and/or development), as well as some other seasonal regional visitors, for motorized/mechanized/non-mechanized exploring, technical sports, fitness activities, guided tours, sightseeing, equestrian, hiking, competitive and organized events, viewing and appreciating natural landscapes and cultural sites. This demand is supported by the area's distinctive landscape, warm winters, and its close proximity to the rapidly growing communities of St. George, Santa Clara, Ivins, Washington, Hurricane, and Toquerville, Utah. Local recreation-tourism visitors value these public lands as their own 'back-yard' recreation settings.

Travel Management Areas

The Arizona Strip Field Office RMP divided the area into four distinct Travel Management Areas (TMAs): Rural, Backways, Specialized, and Primitive. Acceptable modes of access and travel for each TMA have been identified. The Rural TMA provides for the widest variety of motorized, non-motorized, and mechanical travel modes to serve existing and future recreational, traditional, casual, commercial, educational, and private needs adjacent to communities, but not to the detriment or exclusion of the protection of resources. The Backways and Specialized TMAs provide for a variety of motorized, non-motorized, and mechanical travel modes to serve existing and future recreational, traditional, casual, commercial, and private needs in remote, rustic settings, also not to the detriment or exclusion of the protection of resources. In addition, the Specialized TMA is characterized by low to moderate densities of improved roads and primitive roads. In the Primitive TMA, high quality recreation opportunities associated with more primitive recreation experience opportunities and non-motorized uses such as camping, sightseeing, hiking, horseback riding, and hunting, will be maintained/enhanced, provided they will be compatible with the protection and enhancement of sensitive resource values, where appropriate.

Special Recreation Permits

The Arizona Strip Field Office currently has 28 special recreation permits (SRPs) authorized for various activities within the planning area. Of those permits, 21 are commercial hunting permits that cover the entire district, with no specific use areas identified. The other seven permits include specific routes or locations that are within the planning area (see Table 3.3 and Figure 3.2.3-1).

Table 3.3. Mileage of Routes Within the Planning Area Used by Current Permit Holders

SRP Holder	Miles of Routes	Mode of Travel	SRP Activity
Old West Outfitters	51.9	Horses, carriages	Historic travel tours
West Outfitters	14.2	Motorized vehicles	Climbing tours
Winter on the Rocks	32.9	Modified 4x4 vehicles	Extreme 4x4 tours
Tri-State Jamboree	193.4	ATVs	ATV jamboree
Wizard's Rhino Rally	216.3	Motorcycles	Motorcycle race
Pink Jeer Tours	13.3	Motorized vehicles	Vehicle tours
Dreamland Safari Tours	13.3	Motorized vehicles	Vehicle tours

Special Recreation Permits

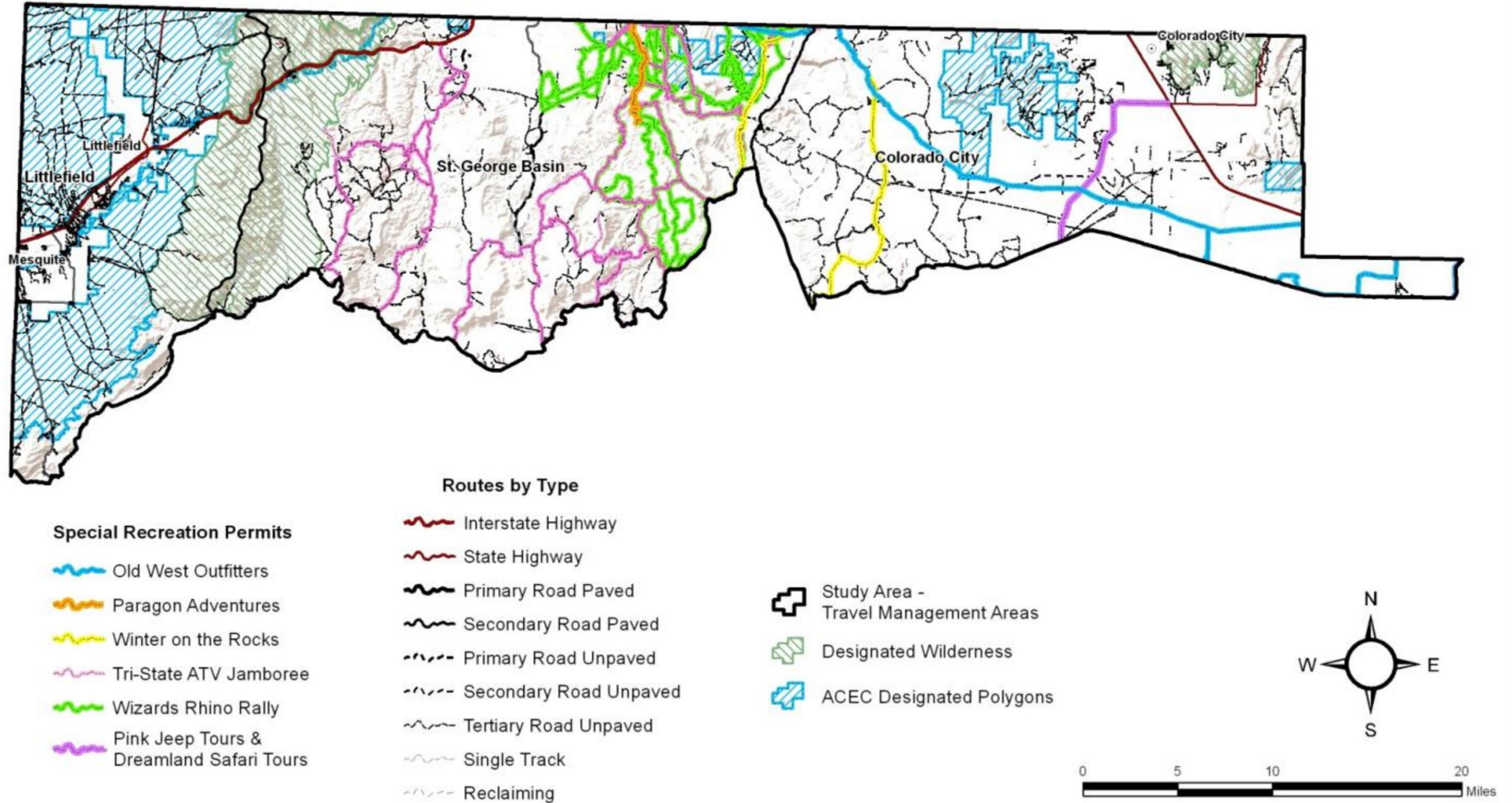


Figure 3.3.3-1. Authorized SRP routes within the planning area

3.3.4 Soils

Soil types in the planning area are quite variable, reflecting the differences and interactions between climate, biological activity, topography, elevation, parent material, and time. Topography ranges from nearly level valley bottoms to vertical cliffs. Elevation in the area ranges from 1,570 feet above sea level near Mesquite, Nevada, to 8,012 feet on top of Mount Bangs. The dominant parent materials in the planning area are sedimentary rocks such as limestone, mudstone, shale, gypsum, and sandstone. Igneous rocks, such as basalt, basalt cinders, and granites are also prevalent, and metamorphic rocks such as gneiss are present in the west part. Soils formed from the different rocks have physical and chemical characteristics specific to the rock types. In addition, many alluvial soils have formed from mixes of these various parent materials resulting in blends of those characteristics.

The National Resources Conservation Service (NRCS) has completed and published soil surveys which cover all of the planning area. These surveys are referenced by number and include:

- Number 623: everything west of the Hurricane Cliffs (NRCS 1994)
- Number 625: lands east of the Hurricane Cliffs to Kanab Creek (NRCS 1992)
- Number 608: the Virgin River Valley from the Nevada State line to Littlefield (NRCS 1980)

The soils have been placed into specific groups based on physical, chemical, and mechanical characteristics important to proper watershed management, such as soil salinity, soil compactability, water erodibility, and wind erodibility. These groupings are described below. In the planning area, the cryptobiotic soils are also the saline gypsiferous soils and therefore they should be considered to be interchangeable when one is mentioned. These groups are used to assess impacts on soils from various uses, to evaluate the potential for restoration of ecological sites, reclamation needs, to set the parameters for watershed management, and to determine the benefits and prioritization of restoration projects.

The miles of roads and acres of soils under each rating in the planning area are presented in a table in each alternative section. Since the roads are of various widths, “acreage” will be used as the parameter to assess the impacts per unit area of each soil group in the alternatives.

Soil Compactibility

The compactibility grouping rates soils according to their sensitivity to compaction from surficial compressive forces such as vehicular travel. Compaction is enhanced by soil moisture.

Compaction is one of the most detrimental impacts to soil quality because it can reduce macropore space enough to hinder good root growth, especially for grasses. Reduced pore space also diminishes the soils' water holding capacity and, along with altered soil structure, decreases the infiltration rate. This in turn causes above normal runoff and accelerated erosion. It also limits the exchange of gases between the soil and the atmosphere, which can limit root growth. Such impacts can lessen the productive potential of the ecological site or alter the potential plant community. Soil compaction can often transform grasslands by allowing invasive species an advantage over grasses, especially invasive species with strong roots or deep root systems such as mustards and tumbleweeds. Some soils are resistant to compression¹. This is partially due to containing a high percentage of coarse fragments and/or coarse sandy textures.

¹ The soil compaction process starts with soil compression. Soil compression leads to a loss of total pore space – in other words larger air-filled pore spaces are crushed into smaller pores. Compression is most likely in soils under moist or wet conditions.

The soils rated as “compactible” contain enough silts and clays sufficient to fill the voids or macropores when vehicles compress them. This can result in physical alteration of soil structure, reduced porosity, permeability, and infiltration rates, which can increase runoff and erosion rates.

The soils containing gypsum with biological crusts are easily compacted. These soils are unique because they tend to crush into silty or sandy powder when they are dry and are very susceptible to wind and water erosion. The biological crusts are normally suspended over a very porous, partially crystalline, irregular lattice-like structure that was formed through a process of dissolution and leaching. This structure is very fragile and may be several inches thick. These soils tend to “fluff-up” and heal themselves during wetting cycles if disturbances are stopped.

Soil Salinity/Cryptobiotic

The salinity grouping rates the soils according to inherent concentrations of soluble salts or salt-forming minerals, primarily sulfates and chlorides, at or near the soil surface.

Saline soils impede most plant growth, are deficient in plant nutrients, and in this planning area, they have high concentrations of gypsum, a sulfate. Many of these soils are also deficient in moisture. Most of these soils are derived from the Moenkopi Formation and the Harrisburg member of the Kaibab Formation, with lesser amounts derived from the Littlefield Formation. Cryptobiotic soil crusts cover a large percentage of these soils and help stabilize them, as well as contribute to vascular plant growth by fixing nitrogen, adding carbon, and trapping water and nutrients. Although plant growth is sparse in these soils, it would be even sparser if it were not for these biological crusts. Erosion of these soils can contribute to downstream salt loading of surface waters such as the Virgin River.

Water Erodibility

Soils are rated under the water erodibility grouping according to their susceptibility to erosion when devoid of all organic cover. The rating is based on the assumption that soils are in a natural, undisturbed state and evaluates impacts under worst-case scenarios (i.e., when organic cover is lacking). The water erodibility rating would likely increase if the soil has been degraded by compaction or surface disturbances. Because wildland soils are non-renewable resources, they have a lower soil loss tolerance than similar cultivated farmland soils.

Soils rated as “none” to “slight” on the water erodibility scale are limited in the planning area. They consist mainly of gravel cobble or stone surfaces and associated rock outcroppings, or other forms of coarse, textured surfaces. These soils tend to have high infiltration rates, slopes of less than 15 percent, and are not likely to erode unless heavily disturbed.

Soils rated as “moderate” under the water erodibility grouping include gravel or cobble-like surfaces with some slopes of 15 to 25 percent, moderately coarse textured surfaces, or surfaces with a shallow restrictive layer. These soils are susceptible to erosion if they are disturbed.

Soils rated as “severe” have slopes of more than 25 percent or have surface textures that are highly erosive such as sands. These soils readily erode when disturbed or when their vegetative cover is reduced.

A separate group of soils rated as “Gully Prone” is characterized by high susceptibility to rill and gully erosion caused by surface disturbances or excessive runoff from surrounding uplands. These soils mostly occur on floodplains or alluvial fans at slopes of less than 5 percent. Gully erosion usually results in irreversible and irreplaceable soil losses.

Wind Erodibility

Soils are rated under the wind erosion potential grouping according to their susceptibility to wind erosion in a worst-case scenario, as if they are devoid of all organic cover. Surface disturbances potentially increase the rating. Ratings can vary according to the percentage of coarse fragments at the surface.

Soils rated as “slight” for wind erosion potential consist mainly of gravel, cobble, or stone surfaces. The soils in these surfaces resist wind erosion due to their structural stability, particle weight, or having a protective cover of coarse fragments.

Soils with moderate wind erosion potential consist mainly of fine textured surfaces or calcareous, medium-textured surfaces that are susceptible to wind erosion when disturbed.

Soils with high wind erosion potential consist mainly of sand and loamy, sand-textured surfaces of medium or smaller sized sands. Many of these soils make up dunes or stabilized dunes. Most of the gypsum soils fall in this group based on their tendency to be crushed into fine silty or sandy particles.

3.3.5 Vegetation

The planning area contains a wide variety of vegetation types (communities) based on soils, climate, and landforms. The major vegetation communities are listed in Table 3.4, along with the dominant plant species for each community, and which sub-region each occurs in.

Table 3.4. Vegetation Communities and Dominant Plant Species

Vegetation Community	Dominant Plant Species	Sub-region(s)
Mojave Mixed Shrub	White ratney (<i>Krameria greyi</i>), white bursage (<i>Ambrosia dumosa</i>), Mormon tea (<i>Ephedra nevadensis</i>), creosotebush (<i>Larrea tridentata</i>), wolfberry (<i>Lycium andersonii</i>), gyp dropseed (<i>Sporobolus nealleyi</i>), big galleta (<i>Pleuraphis rigida</i>)	Littlefield St. George Basin
Creosote/Bursage	Creosote (<i>Larrea tridentata</i>), Joshua tree (<i>Yucca brevifolia</i>), Mormon tea (<i>Ephedra nevadensis</i>), broom snakeweed (<i>Gutierrezia sarothrae</i>), galleta (<i>Pleuraphis jamesii</i>), red brome (<i>Bromus rubens</i>)	Littlefield St. George Basin Colorado City
Chaparral	Mountain mahogany (<i>Cercocarpus montanus</i>), manzanita (<i>Arctostaphylos</i> spp.), turbinella oak (<i>Quercus turbinella</i>), sumac (<i>Rhus trilobata</i>), ceonothus (<i>Ceanothus greggii</i>), buckthorn (<i>Rhamnus</i> spp.), cliffrose (<i>Purshia mexicana</i>), turpentine bush (<i>Thamnosma montanus</i>)	Littlefield St. George Basin
Great Basin Blackbrush	Blackbrush (<i>Coleogyne ramosissima</i>), cliffrose (<i>Purshia mexicana</i>), squirreltail (<i>Elymus elymoides</i> ssp. <i>Elymoides</i>)	St. George Basin Colorado City

Sagebrush	Wyoming big sagebrush (<i>Artemisia tridentata ssp. Wyomingensis</i>), cholla, yucca (<i>Yucca spp.</i>), winterfat (<i>Krascheninnikovia lanata</i>), shadscale (<i>Atriplex confertifolia</i>), Mormon tea (<i>Ephedra nevadensis</i>), galleta (<i>Pleuraphis jamesii</i>)	Littlefield St. George Basin Colorado City
Grassland	Grasses, including grama (<i>Bouteloua spp.</i>), galleta (<i>Pleuraphis jamesii</i>), dropseed (<i>Sporobolus spp.</i>), needle and thread (<i>Stipa comata</i>), squirreltail (<i>Elymus elymoides ssp. Elymoides</i>), three-awn (<i>Aristida spp.</i>)	Colorado City
Pinyon-juniper	Pinyon pine (<i>Pinus spp.</i>), juniper (<i>Juniperus spp.</i>), winterfat (<i>Krascheninnikovia lanata</i>), fourwing saltbush (<i>Atriplex canescens</i>), Wyoming big sagebrush (<i>Artemisia tridentata ssp. Wyomingensis</i>), rabbitbrush (<i>Chrysothamnus spp.</i>), Mormon tea (<i>Ephedra nevadensis</i>), grama (<i>Bouteloua spp.</i>), Indian ricegrass (<i>Oryzopsis hymenoides</i>), , dropseed (<i>Sporobolus spp.</i>), needle and thread (<i>Stipa comata</i>), squirreltail (<i>Elymus elymoides ssp. Elymoides</i>)	St. George Basin Colorado City
Riparian	Cottonwood (<i>Populus spp.</i>), willow (<i>Salix spp.</i>), seep willow (<i>Baccharis salicifolia</i>), arrowweed (<i>Pluchea sericea</i>), cattail (<i>Typha spp.</i>), rushes (<i>Juncus spp.</i>), sedges (<i>Carex spp.</i>), salt cedar (<i>Tamarix spp.</i>)	Littlefield

A detailed discussion/description of each of these vegetation communities can be found in the Arizona Strip Proposed RMP/Final EIS (BLM and NPS 2007).

3.3.6 Wetland/Riparian Zones

Riparian areas are a form of transition between permanently saturated areas and upland areas with visible vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Ephemeral streams or washes that do not exhibit the presence of vegetation that is dependent upon free water in the soil are not considered riparian areas. Riparian areas and wetlands include two groups based on type of soil, vegetation, and hydrology: 1) lotic, which includes running water habitats such as rivers, streams, and springs, and 2) lentic, which includes standing water habitats such as lakes, ponds, bogs, and meadows.

Riparian areas in the planning area primarily include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers, streams, and springs. There are several riparian areas within the planning area, the two most significant of which are the Virgin River (a lotic system) and Willow Spring (a 12-acre wet meadow area on the west side of the Virgin Mountains – a lentic system). Also located within the planning area is Sacaton Cienega, a very unique ecological site consisting of a 2-acre lentic wetland area; a perched water table fed by a weak artesian pressure gradient, through fractures in the folded rocks, is suspected to be the source aquifer. Sacaton Cienega consists of moist to wet, shallow to moderately deep, thick salt-encrusted saline soils that are saturated up to 30 inches. This cienega occurs in an area of low, very dry, rolling gypsum hills; it is vegetated solely with alkali sacaton

(*Sporobolus airoides*). Please refer to Table 3.8 in the Arizona Strip Proposed RMP/Final EIS (BLM 2007) for a complete list of priority riparian areas on the Arizona Strip. As stated in the Final EIS, additional riparian areas exist, but due to their stability, small size, or other factors, they are not included in the list and are not regularly monitored.

Native riparian vegetation in these areas includes cottonwood, willow, seep willow, arrowweed, cattail, rushes, sedges, and a variety of grasses and forbs. In many riparian/wetland areas, native vegetation is being displaced by invasive species such as salt cedar (*Tamarix* spp.). Riparian areas are among the most productive and important ecosystems in the desert southwest. Characteristically, riparian areas have a greater diversity of flora and fauna than adjacent uplands. Healthy riparian systems filter and purify water as it moves through. In addition, healthy riparian areas reduce sediment loads and enhance soil stability, provide microclimatic moderation when contrasted to extremes in adjacent areas, and contribute to groundwater recharge and base flow.

3.3.7 Wildlife, Including Big Game and Migratory Birds

Wildlife within the planning area is typical of the Mojave Desert, Mojave-Great Basin Transition, and Interior Chaparral ecological zones. Given the many different habitat types that occur across the planning area, numerous species of mammals, birds, reptiles, and amphibians are present.

3.3.7.1 Big Game

Desert Bighorn Sheep (*Ovis canadensis nelsoni*)

The planning area is located within Arizona Game and Fish Department's (AGFD) Game Management Units (GMU) 13A and 13B. Desert bighorn sheep habitat is present throughout the Beaver Dam and Virgin mountains within GMU 13B. Bighorn were believed to have been extirpated from the Arizona Strip around the turn of the 20th century. In a cooperative effort between the BLM and AGFD beginning in 1979, bighorn sheep were reintroduced into suitable habitat areas, including the Virgin River Gorge. These reintroduction efforts and successful reproduction have resulted in a gradual increase in the population. Limited hunting occurs on an annual basis.

Desert bighorn sheep habitat has been identified from habitat analysis that evaluates a combination of slope, topography, aspect, vegetation, proximity to escape cover, and water availability (Bighorn Sheep Core Team 2006). To escape predators, bighorn sheep prefer rough, rocky terrain with slopes greater than 20 percent, as is found throughout the Beaver Dam and Virgin Mountains. Bighorn sheep may be found throughout these mountains, and are occasionally seen along Interstate 15 in the Virgin River Gorge. This area is within the Virgin Mountains Wildlife Habitat Area (WHA), allocated for desert bighorn sheep. Vegetation in this WHA is primarily Mojave Desert shrub community; dominant species include creosote bush and Joshua trees at lower elevations, and blackbrush merging into pinyon-juniper woodlands at higher elevations. Reliable permanent waters include the Virgin River, a number of perennial springs in Hedricks, Frehner, and Elbow Canyons, and two wildlife catchments at Figure 4 Canyon and above Hatchet Valley. Bighorn sheep also likely obtain some of the moisture they need from succulent vegetation. During the hot summer months, the sheep stay in shaded areas near water as much as possible and are seldom found more than three miles from dependable water sources. When rain or snowfall occurs, bighorn sheep expand their use of suitable habitat and range out from permanent waters. They also commonly drink from ephemeral pools of water found in rock pockets.

Key habitat use areas for bighorn sheep include concentration areas along the Virgin River and at reliable waters in the Virgin Mountains. More than 80 percent of the suitable habitat within the Virgin Mountains WHA is unoccupied, though the reasons for this are not fully understood (Bighorn Sheep Core Team 2011). However, the population in this WHA is considered stable enough that hunts were initiated in

1989, and AGFD has conducted several captures to transplant animals to other areas within the state – the most recent of these captures occurred in 2007. A total of 82 sheep were captured and removed from the population from 2005-2007 (AGFD unpublished data). AGFD survey results for the Virgin Mountains WHA for the most recent 5-year period are summarized in Table 3.5.

Table 3.5. Recent Bighorn Sheep Survey Results (Virgin Mountains WHA) – Unit 13B North

Year	Rams	Ewes	Lambs	Yearlings	Unclassified	Total	Number per 100 Ewes		
							Rams	Lambs	Yearlings
2006	32	90	18	13	0	153	36	20	14
2007	36	93	17	14	0	160	39	18	15
2008	34	44	8	0	0	86	77	18	0
2011	25	66	14	7	0	112	38	21	11
2012	-	-	-	-	-	-	39	21	-

The Virgin Mountains WHA covers 128,167 acres (200.3 square miles), much of which lies within the Paiute Wilderness. There are 198.6 miles of existing routes that occur within the WHA resulting in an overall road density of 0.99 miles of road per square mile of bighorn sheep habitat. These routes account for a total area (length of road x average width) of 384.8 acres or 0.3 percent of the total area within the WHA (see Table 3.6 below).

The Hurricane Cliffs WHA covers 10,095 acres (15.77 square miles) of potential desert bighorn habitat. The Utah/Arizona state line serves as its northern boundary; this WHA contains no designated wilderness. The topography of the Hurricane Cliffs area includes a relatively narrow band of steep and rugged terrain with sections of cliffs and rock outcrops. The terrain above and below the cliffs is level to slightly rolling valley and plateau topography. Overall aspect of the area is west-northwest, but a variety of different aspects can be found in and around Cottonwood Canyon and Rock Canyon. Elevation relief is about 1,000 feet and travel up and down the terrain could be easily accomplished by bighorn sheep in many areas. Currently there are no bighorn sheep within this WHA. There are 10.84 miles of existing routes within the WHA resulting in an overall road density of 0.69 miles of road per square mile of bighorn sheep habitat. Based on a footprint of 5.3 acres per mile for primary roads, 2.7 acres for secondary roads, and 1.7 acres for tertiary roads, existing routes account for a total area of 303.23 acres or 0.2 percent of the area within the WHAs (see Table 3.6 below).

Table 3.6. Bighorn Sheep Habitat and Roads

Area (Miles ²)	Acres	Miles of Road	Road Density (miles/mile ²)
Virgin Mountains WHA			
200.3	128,167	198.6	0.99
Hurricane Cliffs WHA			
15.77	10,095	10.84	0.69

Mule Deer (*Odocoileus hemionus*)

Mule deer can be found throughout the Arizona Strip. Mule deer populations on the Arizona Strip have fluctuated greatly. In the 1960s and 1970s there were many more mule deer on the western portion of the Arizona Strip than today. The mule deer populations appeared to crash by the early 1980s and have exhibited slow population growth and recovery. A variety of causes for this decline have been suggested including long-term drought, predation, competition from livestock, successional changes in the habitat,

disease, and increased visitor use. While urban encroachment is not an issue in the planning area, the populations of St. George, Utah, and Mesquite and Las Vegas, Nevada have provided a source of increased recreational visitor use to the area. The popularity of antler collection and OHV recreation has increased (AGFD and BLM 2010). Despite wide fluctuations, AGFD considers the mule deer population in the area to be stable (see summary of AGFD survey results in Table 3.7).

Table 3.7. Recent Mule Deer Survey Results (GMUs 13A and 13B)

Year	Bucks	Does	Fawns	Unclassified	Total	Bucks/100 Does	Fawns/100 Does
Unit 13A							
2006	46	107	65	12	230	43	61
2007	40	74	28	3	145	54	38
2008	25	50	21	1	97	50	42
2009	5	37	26	0	68	14	70
2010	23	69	33	0	125	33	48
2011	44	112	87	0	243	39	78
2012	15	48	50	-	113	31	104
Unit 13B							
2006	40	59	38	6	143	68	64
2007	48	61	25	18	152	79	41
2008	34	76	48	0	158	45	63
2009	25	88	37	0	150	28	42
2010	43	110	63	0	216	39	57
2011	42	72	60	2	176	58	83
2012	41	82	76	-	199	50	93

Mule deer habitat within the planning area is categorized as limited, yearlong, summer, summer crucial, and winter crucial (see Table 3.8). Mule deer are generally found in association with more open habitats. Classic mule deer habitat is rough, steep canyons sparsely vegetated with brushy pockets that carve their way down through open grasslands. Mule deer often bed in juniper thickets or other shrubby areas.

Table 3.8. Mule Deer Habitat in the Planning Area

Habitat Category	Area (Miles ²)	Acres	Percent of Area	Miles of Road	Road Density (miles/mile ²)
Limited	354.3	226,770	42.5%	909.8	2.57
Yearlong	290.6	185,976	35%	359.7	1.24
Summer	77.9	49,842	9%	128.5	1.65
Summer Crucial	32.6	20,884	4%	75.9	2.33
Winter Crucial	79.0	50,578	9.5%	173.4	2.19

Water sources can have a major influence on the distribution and movements of deer in semi-arid environments (Watkins, et al. 2007), particularly in summer. During summer, does are often distributed closer to water than bucks, presumably because of their increased need for water during lactation. Water developments appear to increase mule deer populations. Thus, numerous waters have been developed to improve mule deer distribution across the landscape and to sustain healthy populations. Currently there are 16 water catchments targeted to mule deer within the planning area. All of these catchments are located in summer or summer crucial range.

Pronghorn (*Antilocapra americana*)

Pronghorn were historically present on the Arizona Strip but were extirpated in the late 1800s. The BLM and the AGFD began reintroduction efforts in 1961 and they are present today (BLM and NPS 2007). Since reintroduction, pronghorn populations have been cyclic – their numbers have increased and decreased in a direct relationship to precipitation. During periods of drought, poor fawn survival results in low recruitment; conversely, during normal to above normal precipitation years, fawn survival and recruitment increase (AGFD 2009). Both Clayhole Valley and Lower Hurricane Valley support a small herd of pronghorn; these animals are primarily present in areas that consist of grassland, shadscale/saltbush, and sagebrush vegetation communities. AGFD survey data is summarized in Table 3.9.

Table 3.9. Recent Pronghorn Survey Results (GMUs 13A and 13B)

Year	Bucks	Does	Fawns	Unclassified	Total	Bucks/100 Does	Fawns/100 Does
Unit 13B							
2006	44	148	29	0	221	30	20
2007	40	137	7	0	184	29	5
2008	15	79	6	1	101	19	8
2009	24	73	15	0	112	33	21
2010	8	59	7	0	74	14	12
2011	18	129	31	0	178	14	24
2012	13	87	4	-	104	15	5
Unit 13B							
2006	21	34	13	0	68	62	38
2007	21	52	2	0	75	40	4
2008	18	47	17	0	82	38	36
2009	10	39	11	1	61	26	28
2010	13	47	14	0	74	28	30
2011	8	45	10	0	63	18	22
2012	16	43	8	-	67	19	24

Pronghorn habitat in GMUs 13A and 13B consists primarily of Great Basin grassland communities with areas of sagebrush, juniper, and shrub encroachment. Pronghorn habitat on the Arizona Strip is rated by quality from poor to high (see Table 3.10).

Table 3.10. Pronghorn Habitat in the Planning Area

Habitat Category	Area (Miles ²)	Acres	Percent of Area	Miles of Road	Road Density (miles/mile ²)
High Quality	4.1	2,634	1%	18.88	4.59
Moderate Quality	121.7	77,865	39%	253.90	2.09
Low Quality	95.7	61,272	30%	300.64	3.14
Poor Quality	93.4	59,749	30%	229.90	2.46

3.3.7.2 Migratory Birds

The Migratory Bird Treaty Act protects against the take of migratory birds, their nests, and eggs except as permitted. More than 200 species of migratory birds use the planning area for foraging, nesting, or stopover sites during migration.

Priority bird species, as defined by Arizona Partners in Flight (Latta et al. 1999) found in the planning area are listed in Table 3.11 by major habitat type.

Table 3.11. Priority Bird Species in the Planning Area

Habitat Type	Bird Species
Mojave desert scrub	Costa's hummingbird, Le Conte's thrasher
Sagebrush and shadscale/saltbush	Sage thrasher, sage sparrow, Brewer's sparrow
Grassland	Swainson's hawk, ferruginous hawk, burrowing owl
Pinyon-juniper	Gray flycatcher, pinyon jay, gray vireo, black-throated gray warbler, juniper titmouse
Ponderosa pine ²	Northern goshawk, olive-sided flycatcher
Chaparral	Black-chinned sparrow, Virginia's warbler
Riparian	Common blackhawk, yellow-billed cuckoo, southwestern willow flycatcher, Lucy's warbler

3.3.8 Special Status Species

3.3.8.1 Threatened, Endangered, Candidate and Proposed Species

Based on occurrence records and monitoring data, the threatened, endangered, candidate and proposed species known to occur within the planning area are displayed in Table 3.12.

² The only ponderosa pine present in the planning area is a small patch on the top of Black Rock Mountain.

Table 3.12. Threatened, Endangered, Candidate and Proposed Species within the Planning Area

Common Name	Scientific Name	Status	Sub-region
Plants			
Jones cycladenia	<i>Cycladenia humilis</i> var. <i>jonesii</i>	Threatened	Colorado City
Gierisch mallow	<i>Sphaeralcea gierischii</i>	Proposed (Endangered)	St. George Basin
Holmgren milkvetch	<i>Astragalus holmgreniorum</i>	Endangered	St. George Basin
Siler pincushion	<i>Pediocactus sileri</i>	Threatened	St. George Basin Colorado City
Fickeisen cactus	<i>Pediocactus peeblesianus</i> var. <i>fickeiseniae</i>	Proposed (Endangered)	Colorado City
Animals			
Desert tortoise	(<i>Gopherus agassizii</i>)	Threatened + critical habitat	Littlefield
Virgin River chub	(<i>Gila seminuda</i>)	Endangered + critical habitat	Littlefield
Woundfin	(<i>Plagopterus argentissimus</i>)	Endangered + critical habitat	Littlefield
Southwestern willow flycatcher	(<i>Empidonax traillii extimus</i>)	Endangered + critical habitat	Littlefield
Yellow-billed cuckoo	(<i>Coccyzus americanus</i>)	Candidate	Littlefield
California condor	(<i>Gymnogyps californianus</i>)	Endangered (experimental nonessential population south and east of Interstate 15)	Littlefield St. George Basin Colorado City

Three additional threatened, endangered, or candidate species may also occur within the planning area. However, it has been determined by BLM resource specialists that these species would not be affected by actions proposed in this EA. These species are therefore not addressed further in this document. Table 3.13 lists the species that will not be discussed in further detail, along with the rationale for their exclusion from further analysis.

Table 3.13. Threatened, Endangered, or Candidate Species Excluded from Further Analysis

Species	Status	Sub-region(s)	Rationale for Excluding from Further Analysis
Relict leopard frog (<i>Lithobates [Rana] onca</i>)	Candidate	Littlefield	No effects are anticipated for this species since it is currently considered extirpated from the planning area. No measurable impacts (changes from the existing condition) to potential spring habitat would occur as a result of route designation.
Yuma clapper rail (<i>Rallus longirostris yumanensis</i>)	Endangered	Littlefield	Very little suitable clapper rail habitat exists in the planning area, especially after major flood events on the Virgin River in 2005 and 2010. Some areas of riparian marsh are recovering and may provide for some marginal habitat in the near future. No roads directly impact these areas. Any effects would be negligible.
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Threatened	Littlefield St. George Basin Colorado City	Mexican spotted owl (MSO) habitat in the planning area would not be affected by the action alternatives. Cottonwood Canyon contains a small amount of modeled habitat. No existing roads are within the canyon and the nearest road to the canyon edge is over .35 miles away and sees little traffic. Surveys for MSO were conducted in Cottonwood Canyon in 2011 and 2012 resulting in zero owl detections.

Plant Species

Jones cycladenia (*Cycladenia humilis* var. *jonesii*)

Habitat and Range Requirements. Jones cycladenia occurs on selenium-rich, saline soils in the Chinle Formation and is associated with cool desert shrub or pinyon-juniper communities. This plant typically grows on steep side slopes (20-50 percent) of canyons. Associated species are roundleaf buffaloberry, cliffrose, prince's plume, flattop buckwheat, corym buckwheat, and penstemons.

Planning Area Evaluation. 1,762 acres in the planning area are designated as the Lone Butte ACEC for protection of the threatened Jones cycladenia. This ACEC is located approximately 8.5 miles southeast of Colorado City. All known populations of Jones cycladenia in the planning area lie within the ACEC. Approximately 0.25 miles of road currently exist within the ACEC.

Gierisch Mallow (*Sphaeralcea gierischii*)

Habitat and Range Requirements. Gierisch mallow is only found on gypsum outcrops associated with the Harrisburg Member of the Kaibab Formation in northern Mohave County, Arizona, and adjacent Washington County, Utah. The Harrisburg Member is the most recent (topmost) exposed geologic layer of the Kaibab Formation. The Harrisburg Member is known for its soils containing high levels of gypsum (gypsiferous soils). Many of the Gierisch mallow populations occur on hillsides or steep slopes. The surrounding plant community is warm desert scrub (Mojave desert scrub). Very little is known about the life history of the Gierisch mallow, as it was only recently described. The species may be perennial because it is woody at the base and the same individuals have been observed for more than one year. It dies back to the ground during the winter and re-sprouts from the base during late winter and spring (January to March), depending on daytime temperatures and rainfall.

There is no information on the historical range of this species because it is a relatively newly discovered plant. Currently, there are 18 known populations of the Gierisch mallow restricted to less than approximately 460 acres in Arizona and Utah. There are no other known populations of the Gierisch mallow.

Planning Area Evaluation. Gierisch mallow populations in the planning area are located south of the Black Knolls, approximately 12 miles southwest of St. George, Utah, with the southernmost population of this group being on the edge of Black Rock Gulch near Mokaac Mountain. All mapped populations in the planning area are within 0.62 miles of an existing road. There are 8,862 acres of proposed critical habitat that occur on BLM land in the planning area, known as Unit 2-Black Knolls (USFWS 2012a). Unit 2 is located south of Interstate 15 as this highway crosses the state line of Arizona and Utah, and is bounded by Black Rock Gulch to the west and Mokaac Mountain to the south and east.

Holmgren milk-vetch (*Astragalus holmgreniorum*)

Habitat and Range Requirements. Holmgren milk-vetch is a short-lived perennial that occurs primarily on gravelly slopes and washes on the Virgin limestone member of the Moenkopi Formation. Seeds are thought to be dispersed by water as plants are generally found on the skirt edges of washes or in run-off channels around mounds (Harper 1997; Van Buren 2003). Rodents and smaller ground-dwelling birds may also be dispersal agents. At the landscape level, the dominant plant community or land cover within which this plant occurs is described as Sonora-Mojave Creosotebush-White Bursage Desert Scrub. Plants usually occur on bare soils with less than 20 percent living cover (Van Buren 2003).

Planning Area Evaluation. The Black Knolls ACEC (428 acres) lies within the planning area, just northeast of the Black Rock Interchange on Interstate 15. This ACEC was designated for protection of

this plant species. Approximately 2.6 miles of road occur within the ACEC. All mapped populations of Holmgren milk-vetch that occur in the planning area are within 0.2 miles of existing roads.

Siler pincushion cactus (*Pediocactus sileri*)

Habitat and Range Requirements. The Siler pincushion cactus is found mostly in the Schnabkaib and middle red member in the Moenkopi Formation. The cactus is found exclusively on gypsiferous clay to sandy soils apparently high in soluble salts. The Siler pincushion cactus occurs within three broad vegetation communities. The largest distribution is in the Great Basin desert shrub biotic community; a few of the higher elevation cacti sites are located in the Great Basin conifer woodland and plains and Great Basin grassland; one low elevation cactus site is in the Mojave Desert Scrub (Brown and Lowe 1977).

Planning Area Evaluation. Scattered populations occur in the eastern St George Basin and Colorado City sub-regions. The Fort Pearce ACEC (5,724 acres) was designated for the protection of the Siler pincushion cactus, and the Lost Spring Mountain ACEC (19,248 acres) was designated in part for the protection of the cactus. Approximately 96 percent of the known mapped populations occur within these ACECs, with approximately 60 acres occurring outside the ACECs (all within the Colorado City sub-region). There are 72.1 miles of existing routes within both ACECs, with approximately 1.4 miles of routes occurring within the mapped range of the cactus.

Fickeisen cactus (*Pediocactus peeblesianus* var. *fickeiseniae*)

Habitat and Range Requirements. Fickeisen plains cactus grows on shallow soils by exposed layers of Kaibab limestone on the margins of canyons or well-drained hills in Navajoan desert or Desert Grassland/sagebrush at 4,000 to 5,000 feet. Fickeisen plains cactus is a narrow endemic restricted to Kaibab limestone-derived soils. The cactus typically occurs in desert grassland, saltbush desert, and sagebrush. Most populations occur on the margins of canyon rims, on flat terraces or benches, or on the toe of well-drained hills with less than 20 percent slope (AGFD 2011b).

Planning Area Evaluation. One small population occurs within the planning area at the southern boundary of the Colorado City Sub-region (8.8 acres). The entirety of this cluster lies within 0.2 miles of existing roadways. The Clayhole Valley Unit of proposed critical habitat (USFWS 2012b) covers 338 acres of BLM land within or adjacent to the planning area; there are 2.5 miles of existing roads within this proposed critical habitat.

Animal Species

Desert tortoise (*Gopherus agassizii*)

Habitat and Range Requirements. Desert tortoises of the Mojave population are most active during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and after infrequent summer monsoons. Desert tortoises spend the remainder of the year in burrows, escaping the extreme weather conditions of the desert (AGFD 2010).

The Mojave population of desert tortoise is found in the flat inter-montane basins north and west of the Colorado River. Habitat for tortoise includes sandy loam to rocky soils in valleys, bajadas, and rocky slopes and hills in Mojave desertscrub and the Lower Colorado River Valley subdivision of Sonoran desertscrub. Desert tortoises are generally found below 4,000 feet in Joshua tree yucca (*Yucca brevifolia*) and Mojave yucca (*Yucca schidigera*) communities, creosotebush (*Larrea tridentata*) and saltbush scrub habitats, and in some ocotillo-creosote habitats. They occupy a wide variety of soil types, ranging from sand dunes to rocky hillsides, and from caliche caves in washes to sandy soils and desert pavements. The

tortoise must have suitable soils and terrain for constructing a burrow and must have adequate annual and perennial plants in the spring and/or summer for forage (Berry and Duck 1999, AGFD 2010).

Adequate shelter is one of the most important habitat features. Tortoises dig burrows below vegetation to provide protection from heat and predators. Tortoise burrows vary considerably in length and type. The style of burrow appears to be dependent upon the region, soil type, and vegetation in which it is found. Burrows in the eastern Mojave Desert of Northwestern Arizona and Utah are of two basic types: deep winter dens in caliche caves in washes, some of which are 30 feet in length; and shallower summer burrows three to six feet in length in the flat areas (Berry and Duck 1999). The number of burrows the tortoise uses may depend on age and sex, as well as on the season.

Planning Area Evaluation. Desert tortoise habitat in the planning area is present only in the Littlefield Sub-region. There are 92,250 acres of designated critical habitat located within this sub-region. Primary constituent elements of the critical habitat for the Mojave population of the desert tortoise (USFWS 1994) are as follows:

- 1) sufficient space to support viable populations within each of the six recovery units and provide for movements, dispersal, and gene flow;
- 2) sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species;
- 3) suitable substrates for burrowing, nesting, and overwintering;
- 4) burrows, caliche caves, and other shelter sites;
- 5) sufficient vegetation for shelter from temperature extremes and predators; and
- 6) habitat protected from disturbance and human-caused mortality.

Most critical habitat designated for the desert tortoise in the planning area is within the Beaver Dam Slope ACEC (51,984 acres) and the Virgin Slope ACEC (39,514 acres). Certain lands in the Beaver Dam Mountains and on the upper bajada of the Virgin Mountains are designated critical habitat but are not included in the ACECs. Tortoise critical habitat excluded from the Beaver Dam and Virgin Slope ACECs are mostly within the Beaver Dam Mountains Wilderness and Paiute Wilderness.

The only major paved road within the Beaver Dam Slope or Virgin Slope ACEC is Highway 91. Desert tortoises have been injured or killed in the past by collisions with vehicles on Highway 91 north of Littlefield, Arizona. Fencing was installed along both sides of the highway in 2009 to prevent tortoises from crossing the road. A network of ranch, mine, and graded dirt roads cross much of the ACECs. OHV activity has resulted in habitat damage, and use appears to be increasing, particularly adjacent to the Littlefield – Beaver Dam area and along the Arizona – Nevada border northeast of Mesquite. Development along Beaver Dam Wash presents some obstacles to desert tortoise movement, but habitat is more or less continuous throughout the ACECs. However, the ACECs are isolated from each other by the combination of the Virgin River, Interstate 15, and Highway 91. Existing route density in desert tortoise habitat is summarized in Table 3.14.

Table 3.14. Desert Tortoise Habitat and Roads

Habitat Designation	Miles of Road	Acres	Miles ²	Road Density (miles/mile ²)
Desert Tortoise ACECs	283.44	91,498	142.97	1.98
Desert Tortoise Critical Habitat	230.09	92,250	144.14	1.6

Virgin River chub (*Gila seminuda*)

Habitat and Range Requirements. Virgin River chub occur only in the mainstream of the Virgin River, and occasionally in the immediate mouths of its major tributaries, such as Beaver Dam Wash. Water in the Virgin River is generally warm, turbid, and saline, with the primary vegetation on its banks being tamarisk. Virgin River chubs are most often associated with deep runs or pool habitats of slow to moderate velocities with sand and instream cover, such as root snags and large boulders (AGFD 2001b, USFWS 2000). Larger individuals may be found in a wider range of water depths and velocities than smaller individuals. Little is known about the habitat preferences of larval and small juveniles. Other habitat elements also include side channels, secondary channels, backwaters, and springs.

Planning Area Evaluation. Virgin River chub are present in the mainstream of the Virgin River, and they also occur in Beaver Dam Wash. As shown in Table 3.15, 693 were counted in the Virgin River during seine haul surveys in 2012 and 19 were counted in Beaver Dam Wash in 2011. These two waterways in the Littlefield Sub-region are the only areas of suitable habitat within the planning area. The Virgin River Corridor ACEC, designated partially for the protection of Virgin River fishes (including both the Virgin River chub and woundfin), contains 6.82 miles of existing routes, resulting in an overall road density of 2.11 miles of road per square mile (Table 3.16).

Table 3.15. Virgin River Chub Survey Results for the Virgin River in Arizona

Survey area - year	Virgin River Chub counted
Virgin River - 2009	692
Virgin River - 2010	154
Virgin River - 2011	237
Virgin River - 2012	693
Beaver Dam Wash - 2011	19

Table 3.16. Virgin River Corridor ACEC Road Density

Existing Route Designation	Miles	Road Density (Miles/Mile ²)
Open	6.82	2.11
Non-motorized	1.07	

Woundfin (*Plagopterus argentissimus*)

Habitat and Range Requirements. Woundfin live in swift parts of silty, warm streams, seemingly avoiding clear waters and are very seldom found in quieter pools (AGFD 2000). Within the Virgin River, the species seems to be restricted to approximately 50 miles of perennial reaches of the Virgin River in Utah, Arizona, and Nevada, including the Arizona Strip Field Office portion where they are sporadically found.

Woundfin adults and juveniles are most often collected from runs and quiet waters adjacent to riffles, with juveniles using habitats which are generally slower and deeper than adults. Woundfin larvae are collected most frequently from backwaters or slow-velocity habitat along stream margins, often associated with dense growths of filamentous algae (USFWS 1995). Fry may be found in shallow areas

next to the channel. Pools, which often contain predatory nonnative fish species, are generally avoided by woundfin of all sizes and ages.

Little information presently exists on movement of woundfin. Downstream movement within the Virgin River by adults and other life stages has been noted (T.B. Hardy and J.E. Deacon, unpublished data), but the extent of upstream movement, if any, is not known (USFWS 1995).

Planning Area Evaluation. Woundfin occur in the mainstream of the Virgin River, although they are rare. They also may occur in Beaver Dam Wash near its confluence with the Virgin River. As shown in Table 3.17, 56 were counted in the Virgin River during seine haul surveys in 2012, but none were counted in 2011. These two waterways in the Littlefield Sub-region are the only areas of suitable habitat within the planning area. Road density for the Virgin River Corridor ACEC is shown above (in Table 3.16).

Table 3.17. Woundfin Survey Results for the Virgin River in Arizona

Survey area - year	Woundfin counted
Virgin River - 2009	0
Virgin River - 2010	0
Virgin River - 2011	2
Virgin River - 2012	56
Beaver Dam Wash - 2011	0

Southwestern willow flycatcher (*Empidonax traillii extimus*)

Habitat and Range Requirements. The southwestern willow flycatcher is a riparian obligate, nesting along rivers, streams, and other wetlands in dense riparian habitats from sea level to over 7,000 ft. Southwestern willow flycatchers most often select dense thickets of Geyer willow (*Salix geeyeriana*), coyote willow (*Salix exigua*), Goodding's willow (*Salix gooddingii*), boxelder (*Acer negundo*), tamarisk (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolio*), or live oak (*Quercus agrifolia*) for nesting. Other plant species less commonly used for nesting include buttonbush (*Cephalanthus* sp.), black twinberry (*Lonicera involucrata*), cottonwood (*Populus* spp.), white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), and stinging nettle (*Urtica* spp.).

In Arizona, over 75 percent of flycatcher nests located between 1995 and 2000 were located in tamarisk (Paradzick et. al. 2001). However, the majority of nests (70-76 percent between 2001 and 2003) were located in mixed stands where either native species or tamarisk were dominant; monotypic tamarisk stands were used much less (14-18 percent) (Smith et. al. 2002, Smith et. al. 2003, and Smith et. al. 2004). Recent studies (Owen and Sogge 2002; Drost et. al. 2001) indicate that tamarisk not only provides adequate nesting habitat, but insect numbers are also sufficient to provide food for adult and young flycatchers. Comparisons of reproductive performance (USFWS 2002) and physiological conditions (Owen and Sogge 2002) of flycatchers breeding in native versus exotic vegetation revealed no difference.

Planning Area Evaluation. The entire 34.8-mile section of the Virgin River in Arizona is designated as Critical Habitat for the southwestern willow flycatcher (USFWS 2013). The Virgin River Corridor ACEC includes the 100 year floodplain along the Arizona section of the Virgin River. This 2,065-acre ACEC was designated to provide protection for Virgin River fishes and riparian values.

Riparian habitat in the planning area has been further refined through site-specific assessments of possible southwestern willow flycatcher nesting areas. These areas fall into two categories: suitable and potential.

“Suitable” habitat has the density, height, and structure components preferred for southwestern willow flycatcher nesting, whereas “potential” habitat does not have density, height or structure components required for nesting but is expected to reach that stage at some point in the future. Table 3.18 summarizes the status of these habitat categories in the planning area. All suitable habitat occurs within the Virgin River corridor while approximately 10 acres of potential habitat occurs at Mormon Well on Beaver Dam Wash.

Table 3.18. Southwestern Willow Flycatcher Habitat in the Planning Area

Category	Acres	Area (Miles ²)	Miles of Road	Road Density (miles/mile ²)
Potential	1,001.7	1.56	4.58	2.94
Suitable	70.7	0.11	0.42	3.82

Nesting southwestern willow flycatcher surveys have been conducted by SWCA Environmental Consultants near the Beaver Dam Wash confluence since 2003 (McLeod et al. 2008, 2010, 2011). Breeding pairs have been documented at the monitoring site in 2004, 2009, and 2010. Unpaired birds have been detected in 2005, 2007, and 2008. No detections were made in 2003 and 2006.

Yellow-billed cuckoo (*Coccyzus americanus*)

Habitat and Range Requirements. Yellow-billed cuckoos are primarily restricted to densely wooded rivers and streams and damp thickets with relatively high humidity. In Arizona, habitat for the species consists of lowland riparian habitats including streamside cottonwood and willow groves and larger mesquite bosques. They are rarely observed as transient in xeric desert or urban settings (Corman 1992). In Arizona, most cuckoo nests have been found in willows, but nests have also been discovered in cottonwood, sycamore, alder, mesquite, hackberry, and tamarisk (AGFD 2011a).

Planning Area Evaluation. Three sites with suitable habitat for yellow-billed cuckoos are known from the Virgin River (approximately 35 total acres). All three sites are within the Virgin River Corridor ACEC. Surveys for yellow-billed cuckoos have been conducted at all three sites. The only recorded sightings of the species have been at the Beaver Dam confluence area (in 1978, 1979, and 1999). Cottonwood gallery forest is also present at Mormon Well on Beaver Dam Wash (approximately 74 acres) and could potentially provide habitat for yellow-billed cuckoos, although no records for the species are known at this time from this location. Currently, one route accesses the Beaver Dam confluence area and one route accesses Mormon Well.

California condor (*Gymnogyps californianus*)

Habitat and Range Requirements. California condors often use traditional roosting sites near important foraging grounds (USFWS 1996). Roosting provides opportunity for preening and other maintenance activities, rest, and possibly facilitates certain social functions. Although most roost sites are near nesting or foraging areas, scattered roost sites are located throughout the range (USBR 1999). Cliffs and tall conifers, including dead snags, are generally used as roost sites in nesting areas. California condors nest in various types of rock formations including crevices, overhung ledges, and potholes between 485 m and 1,980 m (1,600 ft. to 6,500 ft.) elevation (Snyder et al. 1986).

Most condor foraging occurs in open terrain. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and lengthy waits at a roost or on the ground near a carcass (USFWS 1996). According to Snyder (1986), ravens were observed taking condor

eggs and have been observed attempting to take others. Golden eagles have been observed attempting to capture condor nestlings (Snyder 1986).

Planning Area Evaluation. Free-flying condors tend to concentrate in areas near the Vermilion Cliffs release site, areas of Zion and Grand Canyon National Parks, and the eastern and western slopes of the Kaibab Plateau. Condors have been documented in areas adjacent to the planning area, but do not regularly occur within the planning area. Suitable nesting and roosting cliff sites are present within the planning area in several locations.

3.3.8.2 Sensitive Species

Based on occurrence records and monitoring data, the sensitive species as displayed in Table 3.19 are known to occur within the planning area.

Table 3.19. BLM Sensitive Species in the Planning Area

Species	Scientific Name	Occurrence
Plants		
Sticky wild buckwheat	<i>Eriogonum viscidulum</i>	BLM Sensitive
Three-cornered milkvetch	<i>Astragalus geyeri</i> var. <i>triquetrus</i>	BLM Sensitive
September 11 stickleaf	<i>Mentzelia memorabilis</i>	BLM Sensitive
Animals		
Birds		
Ferruginous hawk	<i>Buteo regalis</i>	Verified
Northern goshawk	<i>Accipiter gentilis</i>	May occur
Fish		
Desert sucker	<i>Catostomus clarki</i>	Verified
Flannelmouth sucker	<i>Catostomus latipinnis</i>	Verified
Speckled dace	<i>Rhinichthys osculus</i>	Verified
Virgin spinedace	<i>Lepidomeda mollispinis mollispinis</i>	Verified

Thirteen additional sensitive species may also occur (or have been verified) within the planning area. However, it has been determined by BLM resource specialists that these species would not be affected by actions proposed in this EA. These species are therefore not addressed further in this document. Table 3.20 lists the species that will not be discussed in further detail, along with the rationale for their exclusion from further analysis.

Table 3.20. Sensitive Species Excluded from Further Analysis

Species	Rationale for Excluding from Further Analysis
Peregrine falcon <i>Falco peregrinus anatum</i>	Nest sites are located on high cliff faces and are not directly impacted by roads. Any indirect effects from route designation would be negligible and difficult to quantify.
Bald eagle <i>Haliaeetus leucocephalus</i>	May occur during the non-breeding season in small numbers. Bald eagles may be struck by vehicles when feeding on road-killed carcasses along highways, but these types of routes are outside the jurisdiction of the BLM.
Golden eagle <i>Aquila chrysaetos</i>	Golden eagles may be struck by vehicles when feeding on road-killed carcasses along high-speed roads (i.e., paved highways), none of which are within the BLM's jurisdiction, and therefore outside the scope of this EA analysis. Nest sites are located on high cliff faces and are not directly impacted by roads.
Pinyon jay <i>Gymnorhinus cyanocephalus</i>	Road closures could possibly benefit pinyon jays, however less than 0.5 percent of habitat (a negligible amount) would be impacted within the planning area.
Burrowing owl <i>Athene cunicularia hypugea</i>	Burrowing owls occur at low densities within the planning area. Designating some routes as closed could be slightly beneficial to burrowing owls but this species is typically tolerant of low to moderate levels of disturbance.
Allen's big-eared bat <i>Idionycteris phyllotis</i>	Roost sites such as caves and abandoned mineshafts would not be physically altered or blocked through the proposed route designations of any of the alternatives analyzed, nor would prey species (insects) populations or distribution be affected. All action alternatives would restrict motorized travel to fewer miles of road within the planning area and would not be expected to result in any measurable impacts (changes from the existing condition) to this species.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	Roost sites such as caves and abandoned mineshafts would not be physically altered or blocked through the proposed route designations of any of the alternatives analyzed, nor would prey species (insects) populations or distribution be affected. All action alternatives would restrict motorized travel to fewer miles of road within the planning area and would not be expected to result in any measurable impacts (changes from the existing condition) to this species.
California leaf-nosed bat <i>Macrotus californicus</i>	Roost sites such as boulder piles, caves, and abandoned mineshafts would not be physically altered or blocked through the proposed route designations of any of the alternatives analyzed, nor would prey species (insects) populations or distribution be affected. This species is primarily found in Sonoran desert scrub south of the Mogollon Plateau and is unlikely to occur in the planning area. All action alternatives would restrict motorized travel to fewer miles of road within the planning area and would not be expected to result in any measurable impacts (changes from the existing condition) to this species.
Greater western mastiff bat <i>Eumops perotis californicus</i>	Roost sites such as rock crevices would not be physically altered or blocked through the proposed route designations of any of the alternatives analyzed, nor would prey species (insects) populations or distribution be affected. All action alternatives would restrict motorized travel to fewer miles of road within the planning area and would not be expected to result in any measurable impacts (changes from the existing condition) to this species.
Spotted bat <i>Euderma maculatum</i>	Roost sites such as crevices in cliff faces would not be physically altered or blocked through the proposed route designations of any of the alternatives analyzed, nor would prey species (insects) populations or distribution be affected. All action alternatives would restrict motorized travel to fewer miles of road within the planning area and would not be expected to result in any measurable impacts (changes from the existing condition) to this species.
Desert springsnail <i>Pyrgulopsis deserta</i>	Existing routes do not cross springs but may access them for developed water uses. Routes to developed springs would remain open for maintenance purposes. No measurable impacts (changes from the existing condition) to springs would occur as a result of route designation.
Hydrobiid spring snails <i>Pyrgulopsis spp.</i>	Existing routes do not cross springs but may access them for developed water uses. Routes to developed springs would remain open for maintenance purposes. No measurable impacts (changes from the existing condition) to springs would occur as a

	result of route designation.
Succineid snails Family Succineidae	Existing routes do not cross springs but may access them for developed water uses. Routes to developed springs would remain open for maintenance purposes. No measurable impacts (changes from the existing condition) to springs would occur as a result of route designation.

Plant Species

Sticky wild buckwheat (*Eriogonum viscidulum*)

Habitat and Range Requirements. This plant occurs in low dunes, washes, sandy flats, and slopes in Mojave desert scrub at elevations of 1,180 to 2,492 feet. It is associated with sand dune formations, steep granular soils of mesa alcoves, and solidified sands of dry wash channels in saltbush and creosote bush communities (AGFD 2005).

Planning Area Evaluation. Three small populations occur in the Littlefield Sub-region near the Nevada border. All mapped plants occur within 0.1 miles of existing roads.

Three-cornered milkvetch (*Astragalus geyeri* var. *triquetrus*)

Habitat and Range Requirements. Limited to washes and small pockets of wind-deposited sand within the creosote bush scrub series (Mojave Desert scrub), with sandy soils formed from sedimentary formations (Jurassic age sandstone) at elevations of 1,100 to 2,400 feet. Prefers low-lying, open flat surfaces, with generally southeast aspects. Commonly found in areas of stabilized sand and frequently with a sparse gravel covering (AGFD 2004).

Planning Area Evaluation. Four small populations occur in the Littlefield Sub-region near the Nevada border. All mapped plants occur within 0.15 miles of existing roads. This plant occurs in the same general area as known locations of the sticky wild buckwheat.

September 11 stickleaf (*Mentzelia memorabilis*)

Habitat and Range Requirements. This perennial subshrub is an Arizona endemic in northern Mohave County, in the Clayhole Wash drainage between Colorado City and Mount Trumbull. It grows on dry gypsum-clay outcrops with sparse vegetation at elevations of 4,689 to 5,197 feet. Associated with sparse vegetation consisting mostly of scattered shrubs of *Atriplex canescens* (four-wing saltbush), *Chrysothamnus Greenei* (Green's rabbitbrush), *Ephedra torreyana* (Torrey's Mormon-tea), *Eriogonum wrightii* (Wright's wild buckwheat), and *Tetradymia canescens* (gray horsebrush). (AGFD 2006)

Planning Area Evaluation. Known populations within the planning area are found on approximately 187 acres in the Colorado City Sub-region. All mapped locations lie within 0.4 miles of existing roads with one small cluster bisected by the Navajo Trail (County Road 30).

Animal Species

Ferruginous hawk (*Buteo regalis*)

Habitat and Range Requirements. Ferruginous hawks are large hawks that inhabit the grasslands, deserts, and open areas of western North America – they are the largest North American hawk and are often mistaken for eagles due to their size. Ferruginous means “rusty color” and refers to the bird's

colored wings and legs. During the breeding season, they prefer grasslands, sagebrush, and other arid shrub country. Nesting occurs in trees or utility poles surrounded by open areas. Mammals generally comprise 80 to 90 percent of the prey items or biomass in the diet with birds being the next most common mass component.

Planning Area Evaluation. Ferruginous hawks are known to use open areas within the planning area, especially during the winter when they are fairly common. Although nesting habitat is available and nest attempts are likely, no nest sites are known to occur within the planning area.

Northern goshawk (*Accipiter gentilis*)

Habitat and Range Requirements. In Arizona, northern goshawks are found in coniferous forests in the northern, north-central, and eastern parts of the state at elevations ranging between 4,750 to 9,120 feet (AGFD 2003). Goshawks are also found in pine-oak habitats in isolated mountain ranges in southeastern Arizona. Goshawks in montane areas may winter on or near their home ranges or descend to lower elevations in woodlands, riparian areas, or scrublands (Reynolds et al. 1992). Northern goshawks generally nest in stands of mature trees with a home range of up to 6,000 acres which includes a nest area of 30 acres, a post-fledgling family area of 420 acres, and a foraging area of 5,400 acres (Reynolds et al. 1992). Within the Arizona Strip goshawks most frequently occupy ponderosa pine forests. Their nest sites are typically located on northerly slopes with canopy cover of 50 percent or greater (Reynolds et al. 1992). Goshawks are opportunistic hunters that prey on a variety of birds and small mammals. Their main prey habitat attributes include snags, downed logs, woody debris, large trees, openings, and herbaceous and woody understories. Because goshawks are visually limited in habitats with dense understories, an open understory enhances detection and capture of prey (Reynolds et al. 1992).

Planning Area Evaluation. The only suitable ponderosa pine habitat within the planning area occurs at elevations above 6,500 feet on Black Rock Mountain and near the summit of Mt. Bangs. However, no nest sites are known to occur in these areas at this time. Road density within ponderosa pine habitat is shown in Table 3.21.

Table 3.21. Ponderosa Pine Habitat in the Planning Area

Acres	Miles ²	Miles of road	Density (miles/mile ²)
3,489.6	5.45	7.51	1.38

Desert sucker (*Catostomus clarki*)

Habitat and Range Requirements. Desert suckers are most common in small to moderately large streams at elevations from about 480 to 8,840 feet (AGFD 2002a). Desert suckers are most common in riffles, rapids, and flowing pools, primarily in areas where the stream bottom consists of gravel-rubble with sandy silt in the interstices. Desert suckers are highly adaptable and can survive in a wide range of water temperatures and relatively low oxygen levels. However, the species does not occur in reservoirs.

Spawning occurs on riffles from late winter to early spring. The adults congregate in large numbers during spawning, and the females bury their adhesive eggs in a depression in loose gravelly substrate. The young congregate in quiet waters near the streambank, and progressively move into mainstream areas as they grow. Juveniles mature by their second year at a length of about four to five inches, and individuals can grow to about 31 inches in length. Chironomid (midge) larvae are the primary dietary items for juveniles. Adults are herbivorous, and use their cartilaginous-sheathed mouth to scrape diatoms and algae from rocks; they also ingest plant detritus (AGFD 2002a, Minckley and Marsh 2009).

Desert suckers are generally common throughout areas where they remain extant. However, the species does not occur in reservoirs, such that the building of numerous dams and diversions has decreased the geographic range of this species from historic times. Stocking of non-native fish has also increased competition for desert suckers (AGFD 2002a).

Planning Area Evaluation. Desert suckers are common in the Virgin River (5,750 were counted during seine haul surveys in 2012-Table 3.22) and occur in Beaver Dam Wash. These two waterways in the Littlefield Sub-region are the only areas of suitable habitat within the planning area.

Flannelmouth sucker (*Catostomus latipinnis*)

Habitat and Range Requirements. The flannelmouth sucker is characteristic of large, strongly flowing rivers, but it does poorly in reservoirs. The species occurs at elevations that range from 1,540-3,160 feet. In turbid water, flannelmouth suckers occupy runs and strongly flowing reaches, and sometimes riffles or rapids, whereas in clear water, it stays near obstructions or debris or in deeper eddies and locations along banks during the day, but at night they move to shallows to feed (AGFD 2001a; Minckley and Marsh 2009).

Spawning occurs from April through early June at the upstream end of shallow cobble bars, gravel-cobble substrates in riffles and along the margins of rapids, and in low gradient mouths of tributaries. The larvae and young fish remain in and near tributary mouths to feed and grow, often using shallows and slow-flowing nearshore areas. The larvae primarily feed on Chironomid larvae (midges), cladocerans, copepods, and inorganic material. The juveniles have a similar diet that also includes ostracods and vascular plants, while the diet of adults includes the freshwater shrimp (*Gammarus lacustris*), immature dipterans and other macroinvertebrates, filamentous algae, and debris and detritus (AGFD 2001a; Minckley and Marsh 2009).

Planning Area Evaluation. Flannelmouth suckers are common in the Virgin River (10,323 were counted during seine haul surveys in 2012-Table 3.22) and occur in Beaver Dam Wash. These two waterways in the Littlefield Sub-region are the only areas of suitable habitat within the planning area.

Speckled dace (*Rhinichthys osculus*)

Habitat and Range Requirements. The speckled dace is one of the most widespread and common native fish in the western United States as it occurs in all major drainages and also in most internal basins that are known to support fish (Minckley and Marsh 2009). Speckled dace are most common in shallow water (<2 feet deep), where they often congregate in pools below riffles and eddies. Within Arizona, speckled dace occur at elevations that range from about 1,550 to 8,920 feet (AGFD 2002b). The species occurs throughout the Virgin River where it is typically the most common native fish species (BIO-WEST 2012). Speckled dace have a proclivity to invade tiny headwater streams, as well as to disperse throughout and thrive in desert rivers, which has resulted in their occurring in most springs and streams (Minckley and Marsh 2009).

Breeding occurs in spring and late summer. Reproductive behavior is poorly known, but individuals apparently spawn over coarse substrate using the broadcast spawn method. Speckled dace are mostly omnivorous, as they have been recorded to take aquatic insects, algae, detritus, and occasional terrestrial invertebrates. However, in the Virgin River, plant material was virtually absent from their diet, such that individuals were more insectivorous, with dipteran (fly) larvae comprising the bulk of the diet (Minckley and Marsh 2009).

Speckled dace are generally common throughout their range. There are few threats to the species other than that they do poorly in the presence of non-native predatory fish.

Planning Area Evaluation. Speckled dace are common in the Virgin River (671 were counted during seine haul surveys in 2012-Table 3.22) and are abundant in Beaver Dam Wash (3,561 counted in 2011). These two waterways in the Littlefield Sub-region are the only areas of suitable habitat within the planning area.

Virgin spinedace (*Lepidomeda mollispinis mollispinis*)

Habitat and Range Requirements. The Virgin spinedace is usually found in clear, cool flowing streams that are interspersed with pools, runs, and riffles, but its habitat preferences may vary. Rinne (1971) found that Virgin spinedace inhabited pools, often with undercut banks, debris, or boulders. Deacon and Rebane (1991) reported that Virgin spinedace in the North Fork of the Virgin River used quiet pools most often; in Beaver Dam Wash they occupied narrow, shallow runs with large amounts of emergent vegetation and avoided the deeper pools. Both Deacon and Rebane (1991) and Hardy et al. (1989) observed that Virgin spinedace preferred the shear zone between high and low velocities with cover such as boulders, undercut banks, or vegetation.

The range of this species is limited to tributary streams and forks of the Virgin River. In the river’s mainstream, the species seems to be limited to the area above Quail Creek Diversion in southern Utah as the lower reaches of the river tend to be too warm and turbid. However, it is occasionally found around the mouths of the occupied tributaries.

Planning Area Evaluation. Virgin spinedace are not known to occur in the mainstream of the Virgin River in Arizona but are common in Beaver Dam Wash. These two waterways in the Littlefield Sub-region are the only areas of suitable habitat within the planning area. Table 3.22 displays recent fish survey results for both these areas.

Table 3.22. Recent Fish Survey Results for the Virgin River in Arizona

Year	VRC	WF	SD	FM	DS	VS	Seine Hauls
2009	692	0	579	619	533	0	568
2010	154	0	58	84	67	0	637
2011	237	2	702	598	814	0	538
2012	693	56	671	10323	5750	0	577
Beaver Dam Wash (2011 Only)	19	0	3561	4	292	389	133

VRC – Virgin River chub, WF-woundfin, SD-speckled dace, FM-flannelmouth sucker, DS-desert sucker, VS-Virgin spinedace.

Source: BIO-WEST 2012

3.3.9 Wilderness Characteristics

There are three areas within the planning area (Figure 3.2.9-1) that are managed to maintain wilderness characteristics: Purgatory (located south of Interstate 15, along the northeastern edge of the Paiute Wilderness); Lime Kiln Mountain (south of the Paiute Wilderness, along the ridge of the Virgin Mountains); and Virgin Peak Ridge (along the ridge of the Virgin Mountains, west of Lime Kiln Canyon). During preparation of the Arizona Strip District RMP/EIS (BLM 2007) inventories found these

areas to possess the wilderness characteristics of naturalness, solitude, and opportunities for primitive recreation, which are defined as:

- **Naturalness:** Lands and resources exhibit a high degree of naturalness, are affected primarily by the forces of nature, and are areas in which the imprint of human activity is substantially unnoticeable. The BLM has authority to inventory, assess, and/or monitor the attributes of the lands and resources on public lands, which, taken together, are an indication of an area's naturalness. These attributes may include the presence or absence of roads and trails, fences and other improvements, the nature and extent of landscape modifications, the presence of native vegetation communities, and the connectivity of habitats.
- **Outstanding Opportunities for Solitude:** Visitors may have outstanding opportunities for solitude [...] when the sights, sounds, and evidence of other people are rare or infrequent [and] where visitors can be isolated, alone, or secluded from others.
- **Outstanding Opportunities for a Primitive and Unconfined Type of Recreation:** Visitors may have outstanding opportunities for primitive and unconfined types of recreation [...] where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreation facilities are encountered (BLM 2008a).

In accordance with the Arizona Strip Field Office RMP, these areas are to be managed so that their wilderness characteristics will be ecologically sustainable and resilient to natural and human-caused disturbances.

Table 3.23 lists the three areas managed to maintain wilderness characteristics, along with their total acreage and the miles of routes contained within each area.

Table 3.23. Lands Managed to Maintain Wilderness Characteristics

Name of Area	Acreage	Miles of Routes
Purgatory	11,011	0
Lime Kiln Mountain	8,511	3.4
Virgin Peak Ridge	2,572	2.4

Wilderness Characteristics

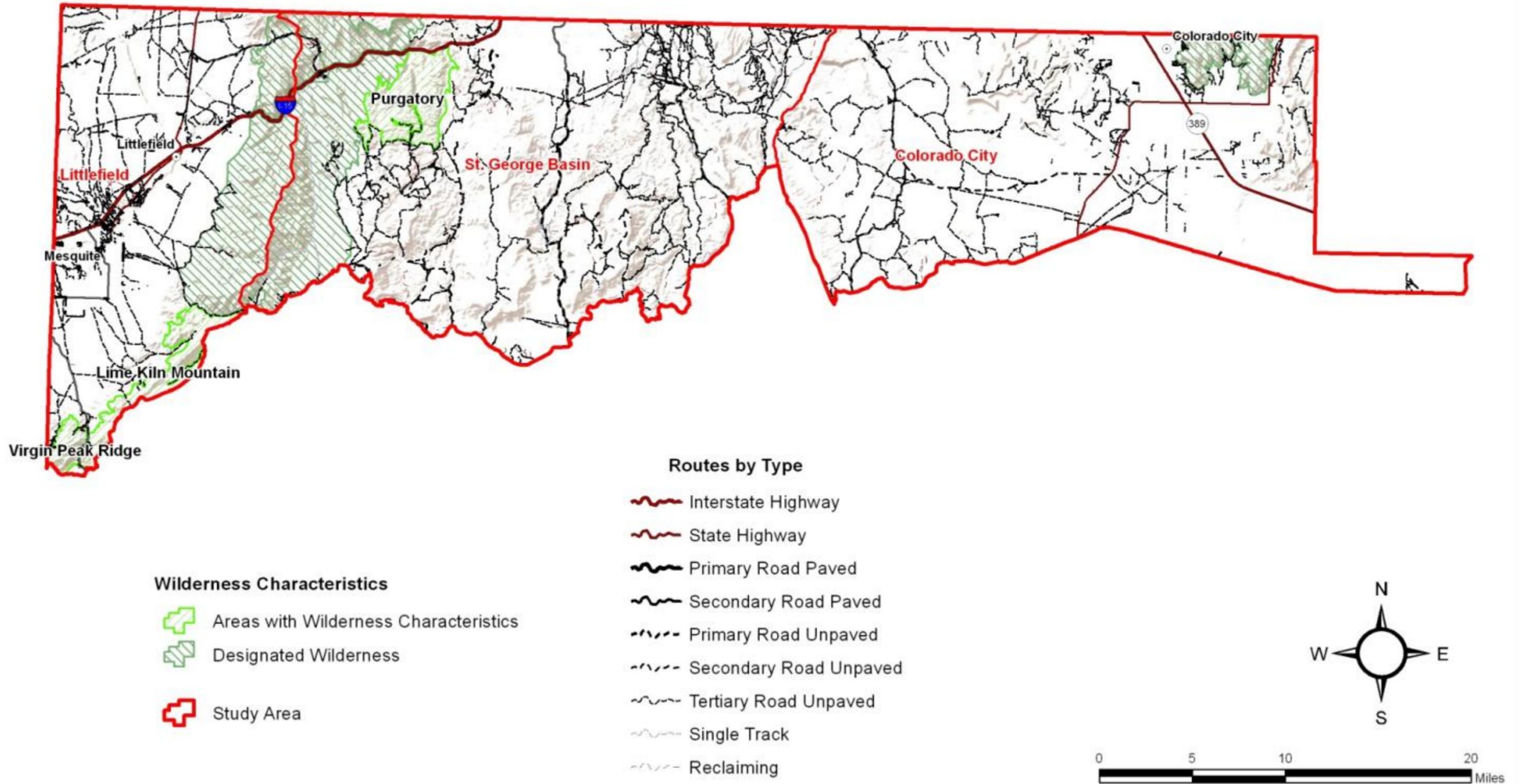


Figure 3.3.9-1. Wilderness characteristics areas with the planning area

Chapter 4

ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This section includes a discussion of the environmental consequences (including a description of direct and indirect impacts, and cumulative effects, if any) of implementing one of the alternatives described in Chapter 2. Impacts are defined as modifications to the existing condition of the environment and/or probable future condition. This EA assesses and analyzes these potential changes to the human and physical/natural environment and discloses the anticipated impacts to the decision maker and the public. This process of full disclosure is one of the fundamental aims of NEPA.

Impacts can be direct or indirect; direct impacts are those effects that are caused by the action or alternative and occur at the same time and place, while indirect effects are those effects that are caused by or would result from an alternative and are later in time but that are still reasonably certain to occur. Cumulative effects are generally assessed using the environmental impacts of past, present, or reasonably foreseeable future actions within the project areas.

This chapter is organized by resource as described in Chapter 3, and is divided into assessments, by alternative, of the following resources: air quality; cultural resources; recreation; soils; vegetation; wetlands/riparian zones; wildlife; special status species; and wilderness characteristics. Impacts to these resources were determined using both quantitative and qualitative approaches. The impact analyses in the following sections were based on knowledge of the resources and the site, review of existing literature information provided by experts and other agencies, and professional judgment.

4.2 AIR QUALITY

As stated in Chapter 3, the planning area is a Class II airshed. Use of unpaved roads in the planning area would create localized air pollution in the form of light fugitive dust, with the amount of fugitive dust created depending on the type of soil, the amount of moisture in the soil, the amount of wind and humidity, and vehicle speed (higher speeds tend to produce more dust). The majority of roads in the planning area are not maintained roads (i.e., they tend to result in relatively slow speeds), which further reduces the level of dust and associated impacts to visibility (BLM 2007). Thus, fugitive dust emissions would be minimized by the natural speed limitations due to the primitive nature of most of the roads within the planning area.

The degree of impacts varies by alternative (i.e., the miles of roads left open in each proposed travel network – see Table 4.1). However, it is unlikely that Class II standards would be exceeded under any of the alternatives.

Table 4.1. Miles of Roads Open/Limited to Administrative Use³ by Alternative

Sub-region	Alternative			
	A – No Action	B	C – Proposed Action	D
Littlefield	Open: 416.9 Admin. Use: 7.7	Open: 84.9 Admin. Use: 109.9	Open: 233.4 Admin. Use: 49.9	Open: 327.0 Admin. Use: 22.6
St. George Basin	Open: 666.4 Admin. Use: 14.1	Open: 274.8 Admin. Use: 148.1	Open: 465.6 Admin. Use: 69.0	Open: 567.7 Admin. Use: 49.1
Colorado City	Open: 384.7 Admin. Use: 0	Open: 91.0 Admin. Use: 164.1	Open: 252.8 Admin. Use: 73.9	Open: 323.4 Admin. Use: 33.8
Totals:	Open: 1,468.0 Admin. Use: 21.8	Open: 450.7 Admin. Use: 422.1	Open: 951.8 Admin. Use: 192.8	Open: 1,218.1 Admin. Use: 105.5

4.2.1 Impacts of Alternative A – No Action

Under Alternative A, the public has access to 416.9 miles of unpaved roads in the Littlefield Sub-region, 666.4 miles in the St. George Basin Sub-region, and 384.7 miles in the Colorado City Sub-region (for a total of 1,468.0 miles within the planning area). There are an additional 21.8 miles of unpaved roads in the planning area that are available for administrative use only (meaning limited, infrequent use). Use of these dirt roads would continue to create localized air pollution in the form of light fugitive dust, especially in the lowest and driest parts of these sub-regions, such as the northern portion of St. George Basin and most of Littlefield, both located in the Mojave Desert, and in areas with silt/clay soils that readily produce dust. Overall impacts to air quality from travel on unpaved roads and road maintenance/improvement activities would be localized and short-term. If changes in air quality did occur due to local events causing additional fugitive dust (winds, short-term motorized recreational events), these changes would be small, local and short term (less than seven consecutive days) and would be below the level of measurable detection.

Road maintenance activities, which would be limited to existing route types, maintenance levels, and frequencies, would also result in short-term fugitive dust. Watering and the use of chemical dust suppressants are used on higher standard roads such as those leading to/from gravel pits and mines, and would greatly reduce the amount of dust emissions from maintenance activities.

4.2.2 Impacts of Alternative B

Under Alternative B, impacts to air quality would be similar to those described under Alternative A but substantially fewer miles of routes would be open for all users. Under Alternative B, the public would have access to 84.9 miles of unpaved roads in the Littlefield Sub-region, 274.8 miles in the St. George Basin Sub-region, and 91.0 miles in the Colorado City Sub-region (for a total of 450.7 miles within the planning area). There would be an additional 422.1 miles of unpaved roads in the planning area that would be available for administrative use only. This would result in fewer areas experiencing fugitive dust from motorized use and reduced overall impacts to air quality since the public would have access to 80 percent less roads than under Alternative A for the Littlefield Sub-region; 59 percent less in the St.

³ Official use related to management of the public lands and resources by federal, state or local governments or non-official use sanctioned by an appropriate authorization instrument, such as right-of-way, permit, lease, or maintenance agreement (BLM 2007).

George Basin Sub-region; and 66 percent less in the Colorado City Sub-region. While considerably more miles of roads are proposed open for administrative use only (109.9 miles in the Littlefield Sub-region, 148.1 miles in the St. George Basin Sub-region, and 164.1 miles in the Colorado City Sub-region) as compared to Alternative A, use of roads for administrative purposes (such as a right-of-way holder accessing a utility line or a grazing permittee accessing a pipeline for maintenance purposes) would limit fugitive dust in these areas because use would be intermittent and short-term.

Installing structures/barriers on routes to control unauthorized use, monitoring to detect routes created by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concerns would help maintain the current good air quality within the planning area. Overall impacts to air quality under Alternative B would be minimal, local and short term.

4.2.3 Impacts of Alternative C – Proposed Action

Under Alternative C, impacts to air quality would be similar to those described under Alternative A but the public would have access to fewer miles of routes open for all users. Under Alternative C, the public would have access to 233.4 miles of unpaved roads in the Littlefield Sub-region, 465.6 miles in the St. George Basin Sub-region, and 252.8 miles in the Colorado City Sub-region (for a total of 951.8 miles within the planning area). There would be an additional 192.8 miles of unpaved roads in the planning area that would be available for administrative use only. This would result in a decreased potential for fugitive dust in the planning area as compared to Alternative A, but an increased potential when compared to Alternative B. Thus, overall impacts to air quality would be reduced from the existing situation as the public would have access to 44 percent less roads as proposed under Alternative A for the Littlefield Sub-region; 30 percent less for the St. George Basin Sub-region; and 35 percent less for the Colorado City Sub-region. While more miles of roads are proposed open for administrative use only (49.9 miles in the Littlefield Sub-region, 69.0 miles in the St. George Basin Sub-region, and 73.9 miles in the Colorado City Sub-region) as compared to Alternative A, use of these roads for administrative purposes would limit fugitive dust in these areas because use would be intermittent and short-term.

Overall impacts to air quality under Alternative C would be minimal, local and short term.

4.2.4 Impacts of Alternative D

Under Alternative D, impacts to air quality would be similar to those described under Alternative A but the public would have access to fewer miles of routes open for all users. Under Alternative D, the public would have access to 327.0 miles of unpaved roads in the Littlefield Sub-region, 567.7 miles in the St. George Basin Sub-region, and 323.4 miles in the Colorado City Sub-region (for a total of 1,218.1 miles within the planning area). There would be an additional 105.5 miles of unpaved roads in the planning area that would be available for administrative use only. This would result in a decreased potential for fugitive dust in the planning area as compared to Alternative A, but an increased potential when compared to Alternatives B and C. Thus, overall impacts to air quality would be reduced from the existing situation as the public would have access to 22 percent less roads as proposed under Alternative A for the Littlefield Sub-region; 15 percent less for the St. George Basin Sub-region; and 16 percent less for the Colorado City Sub-region. This alternative proposes the largest amount of routes open to the public of any of the action alternatives.

While more miles of roads are proposed open to administrative use only (22.6 miles in the Littlefield Sub-region, 49.1 miles in the St. George Basin Sub-region, and 33.8 miles in the Colorado City Sub-region) as

compared to Alternative A, use of these roads for administrative purposes would limit fugitive dust in these areas because use would be intermittent and short-term. This alternative proposes the least amount of routes limited to authorized users of any of the action alternatives.

Overall impacts to air quality under Alternative D would remain minimal, local and short term.

4.3 CULTURAL RESOURCES

Potential impacts on cultural resources, specifically archaeological, historical, and resources of importance to American Indians, are determined through changes in the resources or access to them. The archaeological, historical, and/or traditional cultural property (TCP) settings may contribute to a site's eligibility for the NRHP. NRHP eligibility may be affected if such settings are altered, disturbed, or destroyed so that the criteria for which the site is potentially eligible no longer applies.

The primary cause of direct impacts to archaeological and historical resources is ground disturbance, which destroys the physical features and locations of artifacts, deposits, and structures and allows indirect impacts to subsequently occur, such as erosion. Since no ground disturbance, i.e. new route construction or re-routes is proposed under any of the alternatives at this time, the primary anticipated impacts are expected to be vandalism, OHV use off-road and road maintenance. Continued use of an existing route would not typically produce additional impacts on sites. No new areas of concentration of motorized use on designated routes as a result of any route designation are identified. Any future proposed new routes or re-routes would require intensive (Class III) cultural resource inventories and NEPA analyses and the impacts would be examined at that time.

Indirect impacts may cause surface disturbance that allows subsequent soil erosion and undermining of sites and structures. Indirect impacts may also allow access for vandalism or lack of access for future research, site monitoring and law enforcement. Studies have shown that damage to sites by vandalism is mainly concentrated within several hundred yards of roads (Sullivan et al. 2002). Reducing such access by closing roads or restricting travel could thus protect cultural resources. On the other hand, access can allow for the increased presence of law enforcement, cultural resource personnel, and site stewards for the purposes of researching and monitoring sites and areas. Increased access allows for the increased presence of the public, which can also deter vandalism. This is suggested by recent Archaeological Resources Protection Act cases on the Arizona Strip and in southern Utah showing that pothunters in the area tend to select isolated sites to vandalize so that they are not observed and caught.

Mitigation measures would continue under all alternatives, including ongoing monitoring of sites and areas by law enforcement, staff and site stewards. Section 106 inventories and mitigation would be conducted for any future road construction that may be approved, as required by the NHPA, and a separate NEPA review would be conducted. Emphasis for intensive cultural resource inventory (Class II or III) and archaeological/historical research would continue in the ACECs, on or along historic trails and other areas with the potential for significant sites (potentially eligible for the NRHP). NRHP listed and some NRHP eligible sites would be monitored for vandalism and protected or stabilized, as necessary under all alternatives. Proactive NHPA Section 110 inventory, research, stabilization and preservation would continue under all alternatives. Proactive public education projects would continue under all alternatives.

Route closures that might involve ground disturbance could impact sites, therefore, all route closure areas with ground disturbance would be inventoried for cultural resources (Class III) and these impacts would be mitigated prior to the ground disturbance. Preference for mitigation to cultural resources is avoidance

but full recording, capping of deposits, or excavation might mitigate potential impacts from route closures.

4.3.1 Impacts of Alternative A – No Action

Alternative A provides the most miles of motorized routes open (416.9 miles in the Littlefield Sub-region, 710.1 miles in the St. George Basin Sub-region, and 384.7 miles in the Colorado City Sub-region) to motorized use by the public under any of the alternatives, resulting in the most potential for impacts to cultural resources. This would provide continued access for vandalism of cultural resources and for continued monitoring of the area to stop such damage. It would also provide the greatest access for researchers. Overall impacts to archaeological and historical resources would continue to occur and the impacts could be readily apparent but it would not diminish the integrity of the resource to the extent that their NRHP eligibility would be jeopardized.

Motorized access at Little Black Mountain ACEC is limited to the parking area because the site is fenced. Non-motorized (hiking) access is encouraged on the developed trails at the site. No impacts to the cultural resources at Little Black Mountain ACEC are anticipated as a result of the route designations and TMP proposed under this alternative.

Resources of Traditional Importance to American Indians

Alternative A would provide the most motorized access to resources of importance by American Indians. There would be no change in access by American Indian Tribes in the planning area.

4.3.2 Impacts of Alternative B

Alternative B provides the least miles of routes open to all motorized users (84.9 miles in Littlefield Sub-region, 274.8 miles in the St. George Basin Sub-region, and 91.0 miles in the Colorado City Sub-region). It would also reduce motorized access that could provide additional protection for cultural resources but could also decrease the ability of law enforcement, BLM cultural resource personnel, other BLM personnel, site steward volunteers, and scientific researchers to perform appropriate activities for the protection, management, monitoring, and study of the cultural resource properties.

Impacts could be barely noticeable to measurable and perceptible. Impacts would not likely change one or more character-defining features of archaeological or historic resources so that their NRHP eligibility is jeopardized. Even though sites might be impacted by vandalism, OHV use off-road and road maintenance, they would probably still remain eligible for the NRHP (information could remain that would add to the history of the area).

Overall impacts to archaeological and historical resources, including those in the ACECs (with the miles of routes open to all users dramatically lower than Alternative A) and on/near historic trails, could be measurable and perceptible but would not entirely change their character defining characteristics so that their NRHP eligibility potential is affected.

Resources of Traditional Importance to American Indians

Alternative B would limit access so that more traditional areas and sites would remain undisturbed by visitors; however, it would also increase difficulty of access by American Indians for purposes of collecting resources and using TCPs.

4.3.3 Impacts of Alternative C – Proposed Action

Compared to Alternative A, fewer motorized routes would be open to the public under Alternative C, resulting in reduced motorized access that could provide additional protection for cultural resources but could also decrease the ability of law enforcement, BLM cultural resource personnel, other BLM personnel, site steward volunteers, and scientific researchers to perform appropriate activities for the protection, management, monitoring, and study of the cultural resource properties. Fewer open motorized routes (233.4 miles in the Littlefield Sub-region, 465.6 miles in the St. George Basin Sub-region, and 252.8 miles in the Colorado City Sub-region) would also decrease access to cultural sites by visitors who could collect artifacts and/or damage sites by camping on them or driving across them. Motorized route miles in the ACECs under this alternative are nearly half of those under Alternative A. The types of impacts to archaeological and historical resources as a result of the route designations and TMP would be the same as described under Alternative A. Impacts could be measurable and perceptible, the same as under any other alternative.

Resources of Traditional Importance to American Indians

Alternative C would limit access compared to Alternative A, which would protect traditional areas and sites from disturbance by visitors, including vandals; however, reduced access would also affect American Indians' motorized uses for collecting resources and using TCPs. Impacts would not be as intense as Alternative B because more routes would be open under Alternative C.

4.3.4 Impacts of Alternative D

With the exception of Alternative A, Alternative D offers the greatest access for motorized vehicle users (327.0 miles in the Littlefield Sub-region, 567.7 miles in the St. George Basin Sub-region, and 323.4 miles in the Colorado City Sub-region), resulting in similar impacts to archaeological and historical resources due to potential damage to sites caused by vandalism, OHV use off-road and road maintenance. Access for research would be easier under this alternative than under any other alternative except Alternative A. Monitoring of sites, both privately and federally, would also be more efficient under Alternative D compared to all other alternatives except A. Miles of routes in the ACECs is 71 percent less than under Alternative A and slightly more than under Alternative C.

Resources of Traditional Importance to American Indians

Having more motorized access to various sites in the planning area, with the exception of Alternative A which provides the most access, would aid American Indians in collecting resources and using TCPs.

4.4 RECREATION

Recreational experiences and the potential attainment of a variety of beneficial outcomes are vulnerable to any management action that would alter the settings and opportunities in a particular area. Recreation settings are based upon a variety of attributes, such as remoteness, the amount of human modification in the natural environment, evidence of other users, restrictions and controls, and the level of motorized vehicle use, all of which are related to or interrelated to access. Travel management decisions, including route designations, that greatly alter recreational experiences or settings within the planning area could affect the capacity of that landscape to produce appropriate recreation opportunities and beneficial outcomes.

This section presents potential impacts of the alternatives on recreation as determined through potential changes to recreation activities, experiences and benefits; and recreation settings that are connected to access. The following tables display the miles of routes by alternative within each SRMA (Table 4.2), and TMA (Table 4.3). Each of these subjects is discussed in the following sections.

Table 4.2. Comparison of Route Designations (Miles) by Recreational Settings (or SRMA) and by Alternative

SRMA	Alternative			
	A – No Action	B	C – Proposed Action	D
St. George Basin	Open: 444.4 Admin. Use: 2.9 Closed: 4.7	Open: 193.2 Admin. Use: 82.1 Closed: 177.1	Open: 318.3 Admin. Use: 43.2 Closed: 90.5	Open: 391.9 Admin. Use: 26.9 Closed: 33.7
Virgin Ridge	Open: 48.3 Admin. Use: 0 Closed: 0	Open: 22.3 Admin. Use: 10.3 Closed: 15.7	Open: 35.7 Admin. Use: 5 Closed: 7.7	Open: 42.1 Admin. Use: .3 Closed: 5.9
Totals:	Open: 492.7 Admin. Use: 2.9 Closed: 4.7	Open: 215.5 Admin. Use: 92.4 Closed: 192.8	Open: 389.7 Admin. Use: 48.2 Closed: 98.2	Open: 434 Admin. Use: 27.2 Closed: 39.6

Table 4.3. Comparison of Routes Designated Open (Miles) by TMA and by Alternative

TMA	Alternative											
	A – No Action			B			C – Proposed Action			D		
	Motorized	Non-Motorized	Closed	Motorized	Non-Motorized	Closed	Motorized	Non-Motorized	Closed	Motorized	Non-Motorized	Closed
Rural	469.8 miles	0.4 miles	0 miles	148.7 miles	1.0 miles	210.5 miles	304.6 miles	1.8 miles	119.2 miles	389.8 miles	1.0 miles	59.1 miles
Backways	337.6 miles	2.4 miles	0 miles	157.7 miles	9.3 miles	92.4 miles	237.9 miles	6.8 miles	55.7 miles	280.2 miles	6.9 miles	26.8 miles
Specialized	557.8 miles	0 miles	4.8 miles	139.7 miles	4.6 miles	223.3 miles	371.2 miles	0.7 miles	120.7 miles	487.2 miles	0.6 miles	48.4 miles
Primitive	102.8 miles	25.8 miles	0 miles	4.5 miles	10.4 miles	99.1 miles	38.1 miles	27.4 miles	46.2 miles	60.9 miles	26.6 miles	30.0 miles
Total	1,468.0 miles	28.6 miles	4.8 miles	450.7 miles	25.3 miles	625.0 miles	951.8 miles	36.7 miles	341.8 miles	1,218.1 miles	35.1 miles	164.3 miles

4.4.1 Impacts of Alternative A – No Action

Recreational Settings

Under Alternative A, a total mileage of 1,468 miles of roads within the planning area (416.9 in the Littlefield Sub-region, 666.4 miles in the St. George Basin Sub-region, and 384.7 miles in the Colorado City Sub-region) would remain open to motorized travel and 4.7 miles of roads would be closed. This would preserve existing available opportunities for motorized recreational use and current recreational settings would remain unchanged. It is the most miles open for motorized use of all the alternatives. This alternative would result in apparent beneficial impacts for motorized recreational users and those businesses that support them.

However, because of rapid growth in the St. George, Utah and Mesquite, Nevada areas and the corresponding increase in OHV sales, existing recreation opportunities and social settings for motorized users would change because of a larger number of recreational users. Larger numbers of recreational users, both motorized and non-motorized, could also affect the social settings and recreational opportunities for non-motorized users.

The St. George Basin SRMA and the St. George Basin Rural Park RMZ within the SRMA target a primary recreational strategy of demonstrated community recreation-tourism demand primarily from the local communities as well as some other season regional visitors for a wide variety of recreational activities specifically for motorized/mechanized/non-mechanized exploring, technical sports, fitness activities, guided tours, sightseeing, equestrian, hiking, competitive and organized events, and viewing and appreciating natural landscapes and cultural sites. The only speed event area designated in the Arizona Strip Field Office encompasses most of the St. George Basin SRMA and utilizes routes in an area that extends almost ten miles south of the SRMA. The St. George Basin Rural Park RMZ is to be managed for quick and easy access from town to sustainable day-use adventure, challenge, exercise, social and outdoor recreation. Alternative A provides the most motorized access over any other alternative and therefore, provides the most access for recreational opportunities for motorized activities. Opportunities for non-motorized, primitive recreation also exist within the planning area, although these opportunities are not as extensive as under Alternative B, which provides less miles of motorized routes.

The Virgin Ridge SRMA and the Lime Kiln Cliffs RMZ and Virgin Ridge RMZ within it are targeted to a demonstrated community recreation-tourism market demand from primarily local communities as well as for some other regional visitors, for motorized/mechanized/non-mechanized exploring, world-class rock climbing, and guided touring in close-to-town natural settings. Lime Kiln Cliffs RMZ is managed for close-to-town world-class rock climbing in a natural setting. Virgin Ridge RMZ is managed for self-directed, rugged, adventure in a natural setting close to town with opportunities for scenic, natural and historic appreciation. Because Alternative A provides the most miles of motorized access, this alternative provides the least natural settings for these experiences than any other alternative. Access to the world-class climbing area is retained under all alternatives. The rugged, natural experiences in the Virgin Ridge RMZ are impacted most intensely under this alternative.

Travel Management Areas

As shown in Table 4.3, this alternative has the most miles open for motorized use of all the alternatives (1,468 miles). Of these, 38 percent are in the Rural TMA (which provides for the widest variety of motorized, non-motorized, and mechanical travel modes adjacent to communities); 23 percent are in the Backways TMA and 38 percent are in the Specialized TMA (both of which provide for a variety of motorized, non-motorized, and mechanical travel modes in remote, rustic settings); and 7 percent are in the Primitive TMA (in which recreation opportunities associated with more primitive recreation experience opportunities and non-motorized uses will be maintained/enhanced). This alternative would therefore provide the most opportunities for motorized recreation of all the alternatives, and would result in the greatest amount of access corridors and the least potential for conflicts between users.

This alternative provides the least amount of non-motorized trail opportunities (33.4 miles – of which 28.6 miles are non-motorized routes and 4.8 miles would be on closed routes). Of these non-motorized routes, the vast majority (85 percent) are contained within the Primitive TMA.

Special Recreation Permits

Under Alternative A, since nearly all existing routes open to motorized use would remain open, SRP holders would continue to operate on the routes currently approved under the terms and conditions of their approved permits.

4.4.2 Impacts of Alternative B

Recreational Settings

Under Alternative B, 450.7 miles of roads (84.9 miles in Littlefield Sub-region, 274.8 miles in St. George Basin Sub-region, and 91.0 in Colorado City Sub-region) would remain open to motorized travel. This is 31 percent of the motorized access available across the entire planning area as available in Alternative A. As a result, opportunities for motorized recreation would greatly decrease, generating changes to motorized recreation settings and opportunities for recreational OHV use and related businesses in nearby communities that cater to those users. This alternative would also concentrate steadily increasing motorized use to fewer roads, creating the potential for conflicts between users and a general degradation of the backcountry motorized experience. Conversely, opportunities for non-motorized recreational use would increase dramatically. These beneficial impacts would be major for non-motorized users like hikers, equestrians, and mountain bikers and the related businesses that support them.

Alternative B provides for the least access for motorized recreation experiences in the SRMAs and the most recreation settings and opportunities for non-motorized recreation. It provides only 44 percent of the motorized access in the SRMAs that Alternative A provides and closes the most routes in SRMAs (192.8 miles) of any alternative. It, therefore, is the alternative that best provides for the self-directed, rugged, adventure in a natural setting in the Virgin Ridge SRMA and is the alternative that most affects the motorized recreation opportunities in both the Virgin Ridge SRMA and the St. George Basin SRMA.

Travel Management Areas

As stated above, this alternative has the least miles open for motorized use of all the alternatives (450.7 miles). These route miles are almost evenly spread across the Rural TMA, Backways TMA and Specialized TMA, with only 4.5 miles (1 percent) in the Primitive TMA. This alternative would therefore provide the least opportunities for motorized recreation of all the alternatives, and would concentrate motorized use to fewer roads, creating the potential for conflicts between users as well as a general degradation of the backcountry motorized experience.

This alternative provides the greatest amount of non-motorized trail opportunities (650.3 miles – of which 25.3 miles are non-motorized routes and 625.0 miles would be on closed routes). These non-motorized routes are concentrated primarily in the Specialized TMA (35 percent) and the Rural TMA (33 percent).

Special Recreation Permits

Under Alternative B, some current SRP holders authorized motorized routes would be unaffected (i.e., Pink Jeep Tours, Dreamland Safari Tours, Winter on the Rocks, and Paragon Adventure) and some might be affected, such as Old West Outfitters. Some current SRP holders such as the Tri-State ATV Jamboree and the Wizards' Rhino Rally would have some of their authorized routes closed to motorized use. Alternate roads open to motorized use could be authorized in the future to replace those closed to motorized use. The supply of available motorized routes under Alternative B would be the most

restrictive of all alternatives and might change the recreational experience desired by the affected SRP holders.

4.4.3 Impacts of Alternative C – Proposed Action

Recreational Settings

Under Alternative C, 951.8 miles of roads (233.4 miles in the Littlefield Sub-region, 465.6 miles in the St. George Basin Sub-region, and 252.8 miles in the Colorado City Sub-region) would remain open to motorized travel. This represents more than double the amount of motorized routes left open in Alternative B, but only 65 percent of the miles available under Alternative A. This reduction in miles available for motorized use would likely affect the experiences of a number of recreational OHV users and the businesses in nearby communities that cater to those users; however, the impact would be substantially less than that under Alternative B. Conversely, opportunities for non-motorized recreational use would increase as compared to Alternative A.

Alternative C provides a mix of both motorized and non-motorized recreation opportunities in the SRMAs with 79 percent of the motorized access provided by Alternative A. Alternative C closes 341.8 miles of routes, providing more opportunities for non-motorized recreational settings than Alternatives A or D but 55 percent less than Alternative B.

Travel Management Areas

As stated above, this alternative has substantially more miles open for motorized use than Alternative B, but less than the current situation (Alternative A). These route miles are primarily in the Specialized TMA and Rural TMA; there would only be 38.1 miles (4 percent of all open motorized routes) in the Primitive TMA, which would meet the objective of providing recreation opportunities associated with more primitive recreation experience opportunities and non-motorized uses in this TMA. This alternative provides 378.5 miles of non-motorized trail opportunities (36.7 miles of which are non-motorized routes and 341.8 miles are on closed routes). These non-motorized routes are largely in the Specialized and Rural TMAs, but many are located within the other TMAs as well, which provides for a wide variety of both motorized and non-motorized opportunities.

Special Recreation Permits

Under this alternative some SRP holders (i.e., the Tri-State ATV Jamboree and the Wizards' Rhino Rally) could have 10-13 percent respectively, of their currently authorized motorized routes closed. Other roads open to motorized use could be authorized in the future to replace those closed to motorized use. The impacts to these SRP holders would not be as great under this alternative as they would be under Alternative B.

4.4.4 Impacts of Alternative D

Recreational Settings

Under Alternative D, there would be 1,218.1 miles of motorized routes open to the public for motorized use, which is 83 percent of the routes left open in Alternative A, slightly reducing motorized access in these sub-regions. Impacts would affect the recreational experiences of some motorized recreational users, but would be less as compared to Alternative B since Alternative D proposes nearly two-thirds

more miles of open motorized routes than Alternative B, and less than Alternative C (with 22 percent more miles of routes open than that alternative). Impacts to motorized users would be minor with changes in some recreation settings, but these changes would not affect most motorized recreational users. Conversely, impacts to non-motorized users would be greater than under Alternatives B or C since there would be less non-motorized recreational settings and experiences.

In the SRMAs, Alternative D provides the most recreational settings and opportunities for motorized recreation of the action alternatives, and conversely the least amount of settings and opportunities for non-motorized recreation of the action alternatives. Alternative D has 88 percent of the amount of open routes compared to Alternative A in the SRMAs and closes 39.6 miles (versus 4.7 miles under Alternative A).

Travel Management Areas

This alternative has the most miles open for motorized use of all the action alternatives, but less than the current situation (Alternative A). As with the other alternatives, these route miles are primarily in the Specialized TMA and Rural TMA; there would be 60.9 miles (5 percent of all open motorized routes) in the Primitive TMA, which would meet the objective of providing recreation opportunities associated with more primitive recreation experience opportunities and non-motorized uses in this TMA. This alternative provides the least miles of non-motorized trail opportunities (199.4 – of which 35.1 miles are non-motorized routes and 164.3 miles are on closed routes). The designated non-motorized routes are almost all in the Primitive TMA, while the closed routes that can be used for non-motorized recreation are spread among all four TMAs, which provide for non-motorized recreation opportunities in a variety of settings.

Special Recreation Permits

Under Alternative D, a minimal amount (less than 1 percent) of authorized motorized routes for SRP holders would be affected under this alternative. The vast majority of authorized routes would either be designated open, or would be designated for authorized administrative use.

4.5 SOILS

Soils within the planning area are susceptible to impacts from compaction and disturbance, which can lead to accelerated erosion, soil loss, and reduced productivity. The greatest impacts to soils come from the use of vehicles on poorly-constructed roads and visitor use. The effects of travel on poorly-constructed roads include displaced soil particles, increased soil compaction, creation of new flow paths and channels, and increased runoff. All of these combine to increase soil erosion and ultimate loss. Thus, the greater the number of poorly-constructed routes (i.e., primitive routes, which are the majority of routes in the planning area) left open, the greater the impacts through compaction and erosion.

Impacts to more than one soil group may occur on the same road acres. Therefore, the total acreage impacted, as shown in the tables in the following sections, is less than the sum of all the groups. Impacted acres per mile per soil grouping are different and vary according to the widths and types of routes.

Impact Assessment Methodology and Assumptions

There are four categories of route types within the planning area: primary, secondary, tertiary, and single track. For analysis purposes (to determine acres potentially impacted), measurements of a “typical” route in each category were made, with the following results:

- Primary roads – 44 feet wide (approximately 5.3 acres per mile of disturbance)

- Secondary roads – 22 feet wide (approximately 2.7 acres per mile of disturbance)
- Tertiary roads – 14 feet wide (approximately 1.7 acres per mile of disturbance)
- Single track routes – 3 feet wide (approximately 0.36 acres per mile of disturbance)

These figures were used to compile the numbers included in Tables 4.4 – 4.7.

4.5.1 Impacts of Alternative A – No Action

This alternative represents the current situation – the existing transportation network. The existing travel network would impact the most miles and acreage in each of the soil groups because the most miles of routes are open. The other alternatives would result in closure of various sized routes, but most of the largest (usually graded) access roads would not be affected by closures. There would be a reduction in impacted acres in the other alternatives depending on the widths and lengths of the different routes proposed to be closed. If current routes stay open, the potential impacts to soil groups in miles and acres of road disturbance will be as shown in Table 4.4.

Table 4.4. Miles and Acres of Routes Per Soil Grouping – Alternative A

Soil Grouping – Alternative A	Road Miles	Acres
Compactible	484	811
Cryptobiotic/Saline	318	536
Water Erosion Slight	204	312
Water Erosion Moderate	794	1,313
Water Erosion Severe	566	934
Water Erosion Gully Potential	119	181
Wind Erosion Slight	678	1,135
Wind Erosion Moderate	448	716
Wind Erosion High	558	890

4.5.2 Impacts of Alternative B

This alternative would result in the closing of the largest miles of roads – these roads are relatively narrow unmaintained (i.e., tertiary) routes. This alternative would disturb the least acreage in each of the soil groups. On average, it would reduce the impacts to soils by 39 percent as compared to Alternative A. This alternative would allow for closure of roads where soils are threatened or damaged or where protection of multiple resources is deemed necessary.

Table 4.5. Miles and Acres of Routes Per Soil Grouping – Alternative B

Soil Grouping – Alternative B	Road Miles	Acres
Compactible	299	450
Cryptobiotic/Saline	185	309
Water Erosion Slight	103	140
Water Erosion Moderate	531	867
Water Erosion Severe	338	546
Water Erosion Gully Potential	93	137
Wind Erosion Slight	464	770
Wind Erosion Moderate	303	470
Wind Erosion High	299	450

4.5.3 Impacts of Alternative C – Proposed Action

This alternative would have the third highest amounts of soil group acreage impacted since fewer roads would be designated than under either Alternatives A or D. On average, Alternative C would reduce the impacts to soils by 22 percent as compared to Alternative A. This alternative would also allow for closure of roads where soils are threatened or damaged beyond what is acceptable for use.

Table 4.6. Miles and Acres of Routes Per Soil Grouping – Alternative C

Soil Grouping – Alternative C	Road Miles	Acres
Compactible	415	646
Cryptobiotic/Saline	241	403
Water Erosion Slight	129	185
Water Erosion Moderate	648	1,066
Water Erosion Severe	439	718
Water Erosion Gully Potential	108	163
Wind Erosion Slight	564	940
Wind Erosion Moderate	370	584
Wind Erosion High	415	646

4.5.4 Impacts of Alternative D

This alternative has the most designated routes of the action alternatives. It would have the second highest amounts of soil group acreage impacted. On average, it would reduce the impacts to soils by 9 percent as compared to Alternative A. Roads where there are serious threats or damage to soils may be closed.

Table 4.7. Miles and Acres of Routes Per Soil Grouping – Alternative C

Soil Grouping – Alternative D	Road Miles	Acres
Compactible	498	788
Cryptobiotic/Saline	291	489
Water Erosion Slight	181	273
Water Erosion Moderate	720	1,188
Water Erosion Severe	508	834
Water Erosion Gully Potential	114	172
Wind Erosion Slight	617	1,030
Wind Erosion Moderate	409	650
Wind Erosion High	498	788

4.6 VEGETATION

Vegetation is a fundamental and vitally important component of the biological resources in the planning area. Use of unpaved roads in the planning area would impact the vegetation resource and could result in reduced biological productivity, weed invasion, and unwanted changes in the composition and structure of vegetation communities. Direct impacts that could result from actions proposed in this EA are caused by the establishment, use, maintenance, closing, or rehabilitation of roads and trails; and the introduction, spread, and treatment of noxious and invasive weeds. Indirect impacts are generally caused by dust accumulation immediately adjacent to roads and would include lowered vigor or death of plants.

Use of unpaved roads in the planning area creates localized air pollution in the form of light fugitive dust, with the amount of fugitive dust created depending in large part on vehicle speed (higher speeds tend to produce more dust). The majority of roads in the planning area (79 percent) are classified as “tertiary unpaved” roads that are not maintained. These roads tend to result in relatively slow speeds, which reduces the level of dust produced. Thus, fugitive dust emissions (and dust deposition on adjacent vegetation) would be minimized by the natural speed limitations due to the primitive nature of most of the roads within the planning area.

The degree of impacts varies by alternative (i.e., the miles of roads left open in each proposed travel network).

4.6.1 Impacts of Alternative A – No Action

Vehicles traveling on roads in the transportation system would deposit dust on individual plants. This could lead to a decrease in plant vigor and a decrease in vegetation productivity adjacent to these roads. Under this alternative, the public has access to 416.9 miles of unpaved roads in the Littlefield Sub-region, 666.4 miles in the St. George Basin Sub-region, and 384.7 miles in the Colorado City Sub-region (for a total of 1,468.0 miles within the planning area). Plant productivity may be reduced as a result of depressed photosynthetic capability over time, after repeated deposition of dust on vegetation along these roads. However, as stated above, most of the roads in the planning area are “tertiary unpaved” roads that are not maintained, resulting in relatively slow speeds that reduces the level of dust produced (and dust

deposition on adjacent vegetation). Under this alternative, there are an additional 21.8 miles of unpaved roads in the planning area that are available for administrative use only – deposition of dust would not occur regularly on vegetation adjacent to these roads due to their receiving limited, infrequent use.

Infestation of invasive species may also occur as an indirect effect of vehicular travel along roads. Preventative measures, such as monitoring and treating known infestation sites, would minimize establishment and spread of invasive species.

Road maintenance activities, which would be limited to existing route types, maintenance levels, and frequencies, would also result in short-term fugitive dust. Watering and the use of chemical dust suppressants are used on higher standard roads such as those leading to/from gravel pits and mines, and would greatly reduce the amount of dust emissions (and thus dust deposition on vegetation) from maintenance activities.

Rehabilitation of closed roads would have both short- and long-term direct and indirect impacts, depending upon the closure method. Long-term impacts would result in areas of low rainfall where regeneration is slow. Direct impacts would include injury or loss of vegetation from crushing. Indirect effects would include dust, erosion, soil compaction, and watershed impacts resulting from the rehabilitation process. Long-term benefits would occur as vegetation became reestablished. This alternative proposes the least amount of closed roads of any of the four alternatives (4.7 total miles).

As a result of all of the above factors, the magnitude of impacts would be greater under this alternative than under any other alternative.

4.6.2 Impacts of Alternative B

Under Alternative B, impacts to vegetation resources would be similar to those described under Alternative A but substantially fewer miles of routes would be open for all users. Under Alternative B, the public would have access to 84.9 miles of unpaved roads in the Littlefield Sub-region, 274.8 miles in the St. George Basin Sub-region, and 91.0 miles in the Colorado City Sub-region (for a total of 450.7 miles within the planning area). However, as stated above, most of the roads in the planning area are “tertiary unpaved” roads that are not maintained, resulting in relatively slow speeds that reduces the level of dust produced (and dust deposition on adjacent vegetation).

There are an additional 422.1 miles of unpaved roads in the planning area that would be available for administrative use only, where deposition of dust on adjacent vegetation would not regularly occur due to their receiving limited, infrequent use. This would result in fewer areas being subjected to dust deposition from motorized use and reduced overall impacts to vegetation since the public would have access to 80 percent less roads than under Alternative A for the Littlefield Sub-region; 59 percent less in the St. George Basin Sub-region; and 66 percent less in the Colorado City Sub-region.

Infestation of invasive species may also occur as an indirect effect of vehicular travel along roads. Preventative measures, such as monitoring and treating known infestation sites, would minimize establishment and spread of invasive species, although access to monitor/treat sites would be more limited under this alternative as compared to the other alternatives.

Rehabilitation of closed roads would impact vegetation, depending upon the closure method. Direct impacts would include injury or loss of vegetation from crushing. Indirect effects would include dust, erosion, soil compaction, and watershed impacts resulting from the rehabilitation process. Long-term

benefits would occur as vegetation became reestablished. This alternative proposes the greatest amount of closed roads of any of the four alternatives (625.0 total miles).

Because fewer miles of routes would be open for motorized use (a total of 450.7 miles within the planning area would be open for public use), and the greatest amount of roads would be closed, adverse impacts to vegetation would be the least under this alternative.

4.6.3 Impacts of Alternative C – Proposed Action

Under Alternative C, impacts to vegetation resources would be similar to those described under Alternative A but fewer miles of routes would be open for all users. Under Alternative C, the public would have access to 233.4 miles of unpaved roads in the Littlefield Sub-region, 435.6 miles in the St. George Basin Sub-region, and 252.8 miles in the Colorado City Sub-region (for a total of 951.8 miles within the planning area). However, as stated above, most of the roads in the planning area are “tertiary unpaved” roads that are not maintained, resulting in relatively slow speeds that reduces the level of dust produced (and dust deposition on adjacent vegetation).

There are an additional 192.8 miles of unpaved roads in the planning area that would be available for administrative use only, where deposition of dust on adjacent vegetation would not regularly occur due to their receiving limited, infrequent use. This would result in fewer areas being subjected to dust deposition from motorized use and reduced overall impacts to vegetation since the public would have access to 44 percent less roads than under Alternative A for the Littlefield Sub-region; 30 percent less in the St. George Basin Sub-region; and 35 percent less in the Colorado City Sub-region.

Infestation of noxious weeds and invasive species may also occur as an indirect effect of vehicular travel along roads. Access to all known noxious weed infestation areas has been retained under this alternative to provide for preventative measures, such as monitoring and treating known infestation sites, to continue.

Rehabilitation of closed roads would impact vegetation, depending upon the closure method. Direct impacts would include injury or loss of vegetation from crushing. Indirect effects would include dust, erosion, soil compaction, and watershed impacts resulting from the rehabilitation process. Long-term benefits would occur as vegetation became reestablished. This alternative proposes more closed roads than Alternatives A or D, but less than Alternative B (341.8 total miles).

4.6.4 Impacts of Alternative D

Under Alternative D, impacts to vegetation resources would be similar to those described under Alternative A but fewer miles of routes would be open for all users – this alternative proposes the most open routes of any of the action alternatives. Under Alternative D, the public would have access to 327.0 miles of unpaved roads in the Littlefield Sub-region, 567.7 miles in the St. George Basin Sub-region, and 323.4 miles in the Colorado City Sub-region (for a total of 1,218.1 miles within the planning area). However, as stated above, most of the roads in the planning area are “tertiary unpaved” roads that are not maintained, resulting in relatively slow speeds that reduces the level of dust produced (and dust deposition on adjacent vegetation).

There are an additional 105.5 miles of unpaved roads in the planning area that would be available for administrative use only, where deposition of dust on adjacent vegetation would not regularly occur due to their receiving limited, infrequent use. This would result in fewer areas being subjected to dust deposition from motorized use and reduced overall impacts to vegetation since the public would have access to 22

percent less roads than under Alternative A for the Littlefield Sub-region; 15 percent less in the St. George Basin Sub-region; and 16 percent less in the Colorado City Sub-region.

Infestation of noxious weeds and invasive species may also occur as an indirect effect of vehicular travel along roads. Access to all known noxious weed infestation areas has been retained under this alternative to provide continued implementation of preventative measures.

Rehabilitation of closed roads would impact vegetation, depending upon the closure method. Direct impacts would include injury or loss of vegetation from crushing. Indirect effects would include dust, erosion, soil compaction, and watershed impacts resulting from the rehabilitation process. Long-term benefits would occur as vegetation became reestablished. This alternative proposes more closed roads than Alternative A, but less than Alternatives B or C (164.3 total miles).

4.7 WETLANDS RIPARIAN ZONES

As described in Section 3.3.6, riparian areas are some of the most productive and ecologically valuable portions of the desert southwest, including in the planning area. The overall objective with respect to riparian resources is to manage these areas so as to maintain or restore them to properly functioning condition and to ensure that stream channel morphology and functions are appropriate to the local soil type, climate and landform. Vehicle use in riparian areas has the potential to impact these zones through creation of new trails, trampling and loss of vegetation, soil compaction, impaired regeneration of riparian vegetation, and increased erosion. Increases in trash, pollution, and human waste may also degrade these areas.

4.7.1 Impacts of Alternative A – No Action

As shown in Table 4.8 (following page), under this alternative, the public has access to 7.871 miles (15.562 acres) of unpaved routes in riparian/wetland areas within the planning area. Use of these roads directly affects these riparian areas by compacting soils, altering stream channel morphology and functions, and trampling/crushing riparian-obligate vegetation. Under this alternative, there are an additional 0.056 miles (0.096 acres) of unpaved roads in the planning area that are available for administrative use only – impacts to riparian/wetland zones would not occur regularly due to these routes receiving limited, infrequent use.

Table 4.8. Route Designations in Riparian Areas Alternative A (No Action)		
Designation	Number of Miles	Acres
<i>Littlefield Sub-region – Virgin River & Beaver Dam Wash</i>		
Open to all users	7.306	12.678
Total	7.306	12.678
<i>St. George Basin Sub-region – Virgin River, Sacaton Cienega, Sullivan Spring</i>		
Open to all users	0.025	0.042
Limited to authorized uses	0.056	0.096
Limited to non-motorized use	1.075	1.827
Total	1.156	1.965
<i>Colorado City Sub-region – Parashant Canyon, Cottonwood Spring</i>		
Open to all users	0.540	0.917
Total	0.540	0.917
GRAND TOTAL	9.002	15.560

This alternative, which reflects the current situation (of existing routes) proposes the largest amount of roads open to motorized use of any of the four alternatives. As a result, the magnitude of impacts would be greater under this alternative than under any other alternative. Although measurable in these localized areas, the decrease in vegetative cover would be considered a minor impact, given the small areas that would be affected.

4.7.2 Impacts of Alternative B

As shown in Table 4.9 (following page), under this alternative, the public has access to 0.612 miles of unpaved routes in the planning area, which is substantially less than that proposed in Alternative A. Use of these roads directly affects a total of 1.207 acres of riparian areas by compacting soils, altering stream channel morphology and functions, and trampling/crushing riparian-obligate vegetation. Under this alternative, there are an additional 1.493 miles (2.629 acres) of unpaved roads in the planning area that would be available for administrative use only – impacts to riparian/wetland zones would not occur regularly due to these routes receiving limited, infrequent use. This alternative would close 6.897 miles of routes, that would allow 11.724 acres to reclaim (i.e., riparian vegetation would become reestablished). Included in these closures is the ATV route which passes through the edge of the Sacaton Cienega. Closing this route to motorized use would ensure the saturated soils in that location are not compacted further and that native vegetation (alkali sacaton) would not continue to be disturbed and could revegetate the footprint of the route.

Table 4.9. Route Designations in Riparian Areas – Alternative B		
Designation	Number of Miles	Acres
<i>Littlefield Sub-region – Virgin River & Beaver Dam Wash</i>		
Open to all users	0.556	1.111
Limited to authorized uses	1.117	1.990
Closed to all motorized and mechanized use	5.633	9.577
Total	7.306	12.678
<i>St. George Basin Sub-region – Virgin River, Sacaton Cienega, Sullivan Spring</i>		
Open to all users	0.056	0.096
Closed to all motorized and mechanized use	1.100	1.869
Total	1.156	1.965
<i>Colorado City Sub-region – Parashant Canyon, Cottonwood Spring</i>		
Limited to authorized uses	0.376	0.639
Closed to all motorized and mechanized use	0.164	0.278
Total	0.539	0.917

As with Alternative A, although measurable impacts could occur in localized areas from motorized vehicle use, the decrease in vegetative cover would be considered a minor impact, given the small areas that would be affected. Impacts would be the least under this alternative due to the smallest amount of routes being left open to motorized use.

4.7.3 Impacts of Alternative C – Proposed Action

As shown in Table 4.10 (following page), under this alternative, the public has access to 5.227 miles of unpaved routes in the planning area, which is less than that proposed in Alternative A (but more than Alternative B). Use of these roads directly affects a total of 9.054 acres of riparian areas by compacting soils, altering stream channel morphology and functions, and trampling/crushing riparian-obligate vegetation. Under this alternative, there are an additional 0.882 miles (1.590 acres) of unpaved routes in the planning area that would be available for administrative use only – impacts to riparian/wetland zones would not occur regularly due to these routes receiving limited, infrequent use. This alternative would close 4.757 miles of routes, which would allow 2.993 acres to reclaim (i.e., riparian vegetation would become reestablished). Included in these closures is the ATV route which passes through the edge of the Sacaton Cienega. Closing this route to motorized use would result in the same beneficial impacts as described above for Alternative B.

Table 4.10. Route Designations in Riparian Areas Alternative C – Proposed Action		
Designation	Number of Miles	Acres
<i>Littlefield Sub-region – Virgin River & Beaver Dam Wash</i>		
Open to all users	4.667	8.101
Limited to authorized uses	0.882	1.590
Closed to all motorized and mechanized use	1.757	2.987
Total	7.306	12.678
<i>St. George Basin Sub-region – Virgin River, Sacaton Cienega, Sullivan Spring</i>		
Open for ATV/motorcycle use	0.022	0.036
Open for non-motorized use	1.131	1.923
Closed to all motorized and mechanized use	0.003	0.006
Total	1.156	1.965
<i>Colorado City Sub-region – Parashant Canyon, Cottonwood Spring</i>		
Open to all users	0.539	0.917
Total	0.539	0.917

As with Alternative A, although measurable impacts could occur in localized areas from motorized vehicle use, the decrease in vegetative cover would be considered a minor impact, given the small areas that would be affected.

4.7.4 Impacts of Alternative D

As shown in Table 4.11 (following page), under this alternative, the public has access to 3.555 miles of unpaved routes in riparian/wetland zones within the planning area. Use of these roads directly affects a total of 6.211 acres of riparian areas by compacting soils, altering stream channel morphology and functions, and trampling/crushing riparian-obligate vegetation. Under this alternative, there are an additional 0.999 miles (1.790 acres) of unpaved routes in the planning area that would be available for administrative use only – impacts to riparian/wetland zones would not occur regularly due to these routes receiving limited, infrequent use. This alternative would close 4.447 miles of routes, that would allow 7.561 acres to reclaim (i.e., riparian vegetation would become reestablished).

Table 4.11. Route Designations in Riparian Areas – Alternative D		
Designation	Number of Miles	Acres
<i>Littlefield Sub-region – Virgin River & Beaver Dam Wash</i>		
Open to all users	2.424	4.288
Limited to authorized uses	0.590	1.094
Closed to all motorized and mechanized use	4.292	7.298
Total	7.306	12.680
<i>St. George Basin Sub-region – Virgin River, Sacaton Cienega, Sullivan Spring</i>		
Open to all users	1.131	1.923
Closed to all motorized and mechanized use	0.025	0.042
Total	1.156	1.965
<i>Colorado City Sub-region – Parashant Canyon, Cottonwood Spring</i>		
Limited to authorized uses	0.409	0.696
Closed to all motorized and mechanized use	0.130	0.221
Total	0.539	0.917

As with Alternative A, although measurable impacts could occur in localized areas from motorized vehicle use, the decrease in vegetative cover would be considered a minor impact, given the small areas that would be affected.

4.8 WILDLIFE, INCLUDING BIG GAME AND MIGRATORY BIRDS

4.8.1 Impacts of Alternative A – No Action

4.8.1.1 Big Game

Desert Bighorn Sheep

Bighorn sheep in the planning area typically occupy very steep and rocky terrain in areas that tend to be far from most roads. Papouchis et al. (2001) found that bighorn sheep had low reaction rates to vehicle use in predictable areas, such as well-traveled roads, but that they also showed a tendency to avoid such areas. MacArthur et al. (1982) saw little evidence that bighorn sheep reacted to vehicles with only 8.8 percent showing elevated heart rates during vehicle passes. Bighorn sheep in Rocky Mountain National Park were shown to be impacted by vehicle and visitor use at a watering site (Keller and Bender 2007), but this area received high traffic volume on a paved road (116 to 208 vehicles per hour). The most heavily used road in the planning area within bighorn sheep habitat is the Lime Kiln Road (#242), which averages 16.1 vehicles per day.

This alternative would designate most existing routes as open in bighorn sheep habitat (209.44 miles) and would subsequently result in the highest level of road density in bighorn sheep habitat in the planning area.

Existing routes within habitat for bighorn sheep are summarized in Section 3.3.7.1. While there is no evidence that the existing route network in the planning area is having an impact on bighorn sheep populations, most wildlife management recommendations generally call for reducing road density whenever feasible.

Mule Deer

As described in Section 3.3.7.1, classic mule deer habitat is rough, steep canyons sparsely vegetated with brushy pockets that carve their way down through open grasslands. Much of this habitat is far from roads. Most roads in the planning receive light use. Research on the effects of unpaved roads on mule deer populations has yielded mixed results. Higher road density was correlated with higher instances of poaching in a study conducted in Arizona (Bancroft 1990). Rost and Bailey (1979) found that mule deer pellet counts were lower near roads. Conversely, Wisdom et al. (2004) found no difference in mule deer movements in response to OHVs. In another study, high levels of disturbance yielded no population level responses (Bristow 1998). This alternative would designate the most existing routes as open and would subsequently result in the highest level of road density throughout the planning area in all categories of mule deer habitat.

Pronghorn

Other than the direct loss of habitat, unpaved roads with low traffic volume have little effect on pronghorn populations (AGFD 2006). Existing road density in pronghorn habitat is displayed in Section 3.3.7.1 of this EA. As stated previously, most roads in the planning receive light use. This alternative would designate the most existing routes as open and would subsequently result in the highest level of road density throughout the planning area in all categories of pronghorn habitat.

4.8.1.2 Migratory Birds

This alternative would designate the most existing routes as open and would subsequently result in the highest level of road density throughout the planning area (1.5 miles/mile²). While there is no evidence that the existing route network in the planning area is having an impact on migratory bird populations, most wildlife management recommendations generally call for reducing road density whenever feasible. Priority habitats for birds such as riparian areas and pine-oak forests would be the most sensitive to the effects of open roads.

4.8.2 Impacts of Alternative B

4.8.2.1 Big Game

Desert Bighorn Sheep

Under this alternative open road density in bighorn sheep habitat would be reduced by 28 percent as compared to the existing condition (Alternative A) – see Table 4.12. Since bighorn sheep in the planning area typically occupy very steep and rocky terrain in areas that tend to be far from most roads, impacts to bighorn sheep from the transportation network proposed in Alternative B, beneficial or otherwise, would be negligible.

Table 4.12. Road Data Within Bighorn Sheep Habitat – Alternative B

Bighorn sheep habitat (Miles²)	Proposed Designation	Miles of Road	Road Density (miles/mile²)	Change in Road Density (from existing condition)
216.07	Open & Admin.	150.45	.696	-28%

Mule Deer

Under this alternative open road density in mule deer habitat (as shown in Table 4.13) would be reduced by 30 percent to 33 percent when compared to the existing condition (Alternative A). Impacts would likely be slightly beneficial, especially in winter crucial and summer crucial ranges, due to possible decrease in poaching and a small increase in habitat from reclaimed roads.

Table 4.13. Road Data Within Mule Deer Habitat – Alternative B

Habitat Category	Area (Miles ²)	Proposed Designation	Miles of Road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
Limited	354.3	Open & Admin.	594.62	1.68	-40%
Yearlong	290.6	Open & Admin.	236.3	.81	-32.5%
Summer	77.9	Open & Admin.	68.64	.88	-31%
Summer Crucial	32.6	Open & Admin.	43.56	1.34	-30%
Winter Crucial	79.0	Open & Admin.	101.21	1.28	-33%

Pronghorn

Under this alternative open road density in pronghorn habitat would be reduced by 23 percent to 40 percent when compared to the existing condition (see Table 4.14). Roads that would be closed under this alternative are infrequently used. Allowing closed roads to reclaim to natural site conditions could benefit pronghorn by increasing forage quantity.

Table 4.14. Road Data Within Pronghorn Habitat – Alternative B

Habitat Category	Area (Miles ²)	Proposed Designation	Miles of Road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
High Quality	4.1	Open & Admin.	16.58	4.04	-28%
Moderate Quality	121.7	Open & Admin.	188.07	1.55	-23%
Low Quality	95.7	Open & Admin.	163.22	1.71	-34.5%
Poor Quality	93.4	Open & Admin.	107.56	1.15	-40%

4.8.2.2 Migratory Birds

As shown in Table 2.2, this alternative proposes the greatest amount of closed roads of any of the four alternatives (625.0 total miles). Road closures would reduce potential access points for indirect effects

such as disturbance, invasive plants, illegal dumping, unauthorized off-road travel, and human-caused fires. Reclaimed roads could provide small areas of increased habitat as vegetation became reestablished. Bird species throughout the planning area may benefit from lower road density.

Because fewer miles of routes would be open for motorized use (a total of 450.7 miles within the planning area would be open for public use), and the greatest amount of roads would be closed (625 miles), adverse impacts to migratory birds would be the least under this alternative.

4.8.3 Impacts of Alternative C – Proposed Action

4.8.3.1 Big Game

Desert Bighorn Sheep

Impacts from this alternative would be similar to those described for Alternative B except that fewer roads would be closed. Under this alternative open road density in bighorn sheep habitat would be reduced by 18.5 percent (see Table 4.15).

Table 4.15. Road Data Within Pronghorn Habitat – Alternative C

Bighorn sheep habitat (Miles ²)	Proposed Designation	Miles of Road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
216.07	Open & Admin.	170.73	.79	-18.5%

Mule Deer

Impacts from this alternative would be similar to those described for Alternative B except that fewer roads would be closed. Under this alternative open road density in mule deer habitat would be reduced by 16 percent to 25 percent (see Table 4.16).

Table 4.16. Road Data Within Mule Deer Habitat – Alternative C

Habitat Category	Area (Miles ²)	Proposed Designation	Miles of Road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
Limited	354.3	Open & Admin.	775.29	2.19	-22%
Yearlong	290.6	Open & Admin.	292.19	1.01	-16%
Summer	77.9	Open & Admin.	74.4	.96	-25%
Summer Crucial	32.6	Open & Admin.	49.66	1.52	-20%
Winter Crucial	79.0	Open & Admin.	125	1.58	-18%

Pronghorn

Impacts from this alternative would be similar to those described for Alternative B except that fewer roads would be closed. Under this alternative open road density in pronghorn habitat would be reduced by 11 percent to 18 percent (see Table 4.17).

Table 4.17. Road Data Within Pronghorn Habitat – Alternative C

Habitat Category	Area (Miles ²)	Proposed Designation	Miles of Road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
High Quality	4.1	Open & Admin.	19.31	4.71	-16%
Moderate Quality	121.7	Open & Admin.	216.08	1.78	-11%
Low Quality	95.7	Open & Admin.	207.27	2.17	-17%
Poor Quality	93.4	Open & Admin.	146.24	1.57	-18%

4.8.3.2 Migratory Birds

Under Alternative C, impacts to migratory birds would be similar to those described under Alternative A but fewer miles of routes would be open for all users. Under Alternative C, the public would have access to 951.8 miles of routes in the planning area (35 percent less than Alternative A). This alternative would also close substantially more roads than Alternative A (341.8 miles versus 4.7 miles). Reclaimed roads could provide small areas of increased habitat as vegetation became reestablished. Bird species throughout the planning area may benefit from lower road density.

4.8.4 Impacts of Alternative D

4.8.4.1 Big Game

Desert Bighorn Sheep

Impacts from this alternative would be similar to those described for Alternative B except that fewer roads would be closed. Under this alternative open road density in bighorn sheep habitat would be reduced by 15 percent (see Table 4.18).

Table 4.18. Road Data Within Bighorn Sheep Habitat – Alternative D

Bighorn sheep habitat (Miles ²)	Proposed Designation	Miles of Road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
216.07	Open & Admin.	177.37	.821	-15%

Mule Deer

Impacts from this alternative would be similar to those described for Alternative B except that fewer roads would be closed. Under this alternative open road density in mule deer habitat would be reduced by 9 percent to 13 percent (see Table 4.19).

Table 4.19. Road Data Within Mule Deer Habitat – Alternative D

Habitat Category	Area (Miles ²)	Proposed Designation	Miles of Road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
Limited	354.3	Open & Admin.	900.47	2.54	-10%
Yearlong	290.6	Open & Admin.	316.15	1.09	-9%
Summer	77.9	Open & Admin.	86.29	1.11	-13%
Summer Crucial	32.6	Open & Admin.	55.24	1.69	-11.5%
Winter Crucial	79.0	Open & Admin.	136.18	1.72	-10%

Pronghorn

Impacts from this alternative would be similar to those described for Alternative B except that fewer roads would be closed. Under this alternative open road density in pronghorn habitat would be reduced by 4 percent to 8 percent (see Table 4.20).

Table 4.20. Road Data Within Pronghorn Habitat – Alternative D

Habitat Category	Area (Miles ²)	Proposed Designation	Miles of Road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
High Quality	4.1	Open & Admin.	21.46	5.23	-6%
Moderate Quality	121.7	Open & Admin.	234.85	1.93	-4%
Low Quality	95.7	Open & Admin.	235.16	2.46	-6%
Poor Quality	93.4	Open & Admin.	164.56	1.76	-8%

4.8.4.2 Migratory Birds

Impacts from this alternative would be the same as under Alternative B.

4.9 SPECIAL STATUS SPECIES

4.9.1 Impacts of Alternative A – No Action

4.9.1.1 Threatened, Endangered, Candidate and Proposed Species

Plant Species

Jones Cycladenia

Jones cycladenia occurs within the Lone Butte ACEC. This area is currently mostly roadless and management intent is for it to remain roadless. This species grows on slopes from 20 to 50 percent in the unstable Chinle formation. There are no routes through Jones cycladenia habitat, however approximately 0.25 miles of road exist within the Lone Butte ACEC. Visitors to the area are infrequent. Direct effects to Jones cycladenia from general use of the transportation system are not likely to occur. Proliferation of new routes has not been documented, but would be addressed through monitoring and route designation.

Under this alternative, all 0.25 miles of the existing roads within the Lone Butte ACEC would remain open, resulting in the potential for all of the impacts described above. However, no new routes are proposed, so no new impacts are anticipated.

Gierisch Mallow

Direct effects to Gierisch mallow from general use of the transportation system may occur since this species grows along roadsides. Use of OHVs is not uncommon in the area where this plant occurs due to its proximity to St. George, Utah. Vehicles also provide access to the habitat for foot traffic, particularly hikers. Increased human presence can lead to plants being stepped on and crushed. Motorized and mechanized vehicle use within Gierisch mallow habitat would be limited to designated open routes. Since all cross-country motorized or mechanized travel is prohibited, vehicle damage to plants away from routes would be unlikely.

Under this alternative, all roads within the known area where the Gierisch mallow occurs (25.4 miles) would remain open. These designations could potentially cause a reduction in areas where indirect effects such as illegal off-road vehicle use, trash dumping, and the spread of invasive plants may occur. However, no new routes are proposed, so no new impacts are anticipated.

Holmgren Milk-vetch

Direct effects to Holmgren milk-vetch from general use of the transportation system are not likely to occur as this species does not grow in or adjacent to existing roadways. Use of OHVs is not uncommon in the area where this plant occurs due to its proximity to St. George, Utah. Vehicles also provide access to the habitat for foot traffic, particularly hikers. Increased human presence can lead to plants being stepped on and crushed. Indirect effects could include reduced fitness as a result of dust or physical disturbance. Motorized and mechanized vehicle use within Holmgren milk-vetch habitat would be limited to designated open routes. Since all cross-country motorized or mechanized travel is prohibited, vehicle damage to plants away from routes would be unlikely.

Under this alternative, all 2.6 miles of existing road within the Black Knolls ACEC would remain open to public use, resulting in the potential for all of the impacts described above. However, no new routes are proposed, so no new impacts are anticipated.

Siler Pincushion Cactus

Motorized and mechanized vehicle use within Siler pincushion cactus habitat would be limited to routes designated as open. Since all cross-country motorized or mechanized travel would be prohibited, vehicle damage to plants away from routes is not anticipated. Use of OHVs in this habitat is common and some route proliferation has been documented. Vehicles also provide access to the habitat for foot traffic, particularly hikers. Increased human presence can lead to cactus being stepped on and crushed. Indirect effects could include reduced fitness as a result of dust or physical disturbance.

Under this alternative, 2.46 miles of road within the Fort Pearce ACEC would be designated as closed (for protection of this cactus), leaving the remaining 69.64 miles open to public use. Since all cross-country motorized or mechanized travel is prohibited, vehicle damage to plants away from routes would be unlikely, although vehicles could still injure or kill plants by pulling off the roadway to park or turn around within the habitat. However, no new routes are proposed, so no new impacts are anticipated.

Fickeisen Plains Cactus

Motorized and mechanized vehicle use within Fickeisen cactus habitat would be limited to routes designated as open – under this alternative, all 2.5 miles of existing roads within proposed critical habitat would remain open for public use. Since all cross-country motorized or mechanized travel would be prohibited, vehicle damage to plants away from routes is not anticipated. Indirect effects could include reduced fitness as a result of dust or physical disturbance. OHV use may become a threat to the Fickeisen plains cactus in the future but at this time, the USFWS does not consider it to be a threat to the plant or its habitat (USFWS 2012e).

Animal Species

Desert Tortoise

The Desert Tortoise Recovery Plan found that "paved highways, unpaved and paved roads, trails, and tracks have profound impacts on desert tortoise populations and habitat." Roads impact desert tortoises by fragmenting habitat; reducing available habitat for breeding and foraging activities; providing access corridors for weed invasion, illegal collection/poaching, pollution, wildfires, and habitat-altering projects; increasing erosion; and a variety of other disturbances that change movement patterns and habitat use (USFWS 2011, Boarman 2002). Roads can also act as a barrier to dispersal.

Indirect effects can include loss of access for fire suppression equipment. This may also occur for roads open for administrative use that become impassable through lack of use. Long-term benefits to critical habitat would result from closing and rehabilitating roads, thereby eliminating or reversing many of the adverse effects described above.

Desert tortoises may be injured or killed as a result of collisions with vehicles traveling on designated open roads. However, road miles are not all equal in their effects on desert tortoises due to variables such as road widths, condition, location, traffic type, speed, and volume. In general, the lower the speed and volume of traffic, the lower the likelihood of collision. Most scientific literature concerning the effects of transportation systems on wildlife species are based on paved roads with high traffic volumes, traveling at high rates of speed. However, few of the roads within desert tortoise habitat in the planning area (subject to BLM management) are currently paved and average speeds for most roads are generally less than 35 mph. Traffic counters on two BLM roads within desert tortoise habitat show relatively low use: 16.1 vehicles/day on Lime Kiln Canyon Road (#242) and 8.5 vehicles/day on Cedar Pocket Road (#1005). These are likely the most heavily traveled BLM roads within desert tortoise habitat and would remain open under all alternatives. Collisions with tortoises may be infrequent in the planning area, probably due

to the low traffic volume and speeds of vehicles. In addition to providing opportunities for accidental mortality, roads can also provide access to remote areas for collectors, vandals, and poachers. Implementation of one of the action alternatives may reduce these indirect effects to the species.

Under this alternative, there would be no routes closed in desert tortoise habitat and 5.44 miles of routes available for administrative use only. This alternative would continue the current management of the transportation system and would designate the most open roads in the planning area of all the alternatives, so the impacts described above resulting from open roads would be the most widespread. However, no new routes are proposed, so no new impacts are anticipated.

Virgin River Chub and Woundfin

Open roads are not listed as a direct threat to Virgin River chub or woundfin (USFWS 1995) but may act as access points that lead to indirect threats such as toxic spills, fires, or illegal dumping. As described in Section 3.3.8.1, the Virgin River Corridor ACEC (which was designated partially for the protection of Virgin River fishes, including both the Virgin River chub and woundfin) contains 6.82 miles of existing routes; several of these routes serve as access points to the Virgin River. Under this alternative, all of these routes would remain open and would continue to provide access to the river. However, no new routes are proposed, so no new impacts are anticipated.

Southwestern Willow Flycatcher

The primary direct effect of open roads to southwestern willow flycatchers is habitat fragmentation. Open roads also act as access points that lead to indirect threats such as increased recreational use which in turn may lead to many other impacts: reduction in vegetation through trampling, clearing, woodcutting and prevention of seedling germination due to soil compaction; bank erosion; increased incidence of fire; promoting invasion by exotic plant species; promoting increases in predators and scavengers due to food scraps and garbage (ravens, jays, grackles, skunks, squirrels, domestic cats, etc.); promoting increases in brood parasitic cowbirds; and noise disturbance (USFWS 2002).

As described in Section 3.3.8.1, the planning area contains 1,072.4 acres of suitable and potential southwestern willow flycatcher habitat. There are 5.0 miles of roads within this habitat. Under this alternative, all 5.0 miles would remain open to public use, resulting in the potential for all of the impacts described above. However, no new routes are proposed, so no new impacts are anticipated.

Yellow-billed cuckoo

Vehicle use may directly affect yellow-billed cuckoos by disturbing active nests in occupied habitat. Noise and disturbance could result in reduced reproductive success and nest abandonment. The literature indicates that there may be a direct correlation between recreational activity and decreased riparian bird abundance (Blakesley and Reese 1988).

Vehicle use in riparian areas has the potential to impact yellow-billed cuckoo habitat through creation of new trails, trampling and loss of vegetation, soil compaction, impaired regeneration of riparian vegetation, and increased erosion. Increases in trash, pollution, and human waste may also degrade habitat. The risk of human-caused fire would also be increased.

The routes that directly access the Beaver Dam confluence area and Mormon Well would both remain open under this alternative, resulting in the potential for all of the impacts described above. However, no new routes are proposed, so no new impacts are anticipated.

California condor

This alternative would continue the current management of the transportation network in the planning area. As shown in Table 2.1 of this EA, there would be 1,468 miles of routes designated as open under this alternative, with an additional 21.8 miles available for administrative use only. Individual California condors may be injured or killed by collision with vehicles on open roads, especially if road kill is present. Indirect effects may occur from the ingestion of microtrash left at campsites or other areas of human use. Although this alternative would designate the most number and miles of routes of all the alternatives, the likelihood of encounters with condors is considered rare in the planning area because of the scarcity of condors using this portion of the Arizona Strip. In addition, while the potential exists for condors to collide with virtually any type of vehicle on the ground, the likelihood of such an occurrence is considered rare in the planning area because of the lack of high-speed roads under BLM jurisdiction.

4.9.1.2 Sensitive Species

Plant Species

Sticky wild buckwheat

Direct effects from general use of the transportation system may occur since the known populations of this species occur within 0.1 miles of existing roads. Vehicles can provide access to the habitat for foot traffic, particularly hikers, and increased human presence can lead to plants being stepped on and crushed. Indirect effects could include reduced fitness as a result of dust or physical disturbance. Motorized and mechanized vehicle use within sticky wild buckwheat habitat would be limited to designated open routes. Since all cross-country motorized or mechanized travel is prohibited, vehicle damage to plants away from routes would be unlikely. This alternative represents the current situation – under this alternative, all routes near the known populations of this species would remain open to public use, resulting in the potential for all of the impacts described above. However, no new routes are proposed, so no new impacts are anticipated.

Three-cornered milkvetch

One mapped population of three-cornered milkvetch lies on the service road within the right-of-way for a transmission line. This could result in plants being crushed from continued use of this road, or reduced fitness as a result of dust or physical disturbance. Since this alternative would leave this road open, the potential exists for all of the impacts described above to occur. However, no new routes are proposed, so no new impacts are anticipated.

September 11 stickleaf

Direct effects from general use of the transportation system may occur since the known populations of this species occur within 0.1 miles of existing roads. Vehicles can provide access to the habitat for foot traffic, particularly hikers, and increased human presence can lead to plants being stepped on and crushed. Indirect effects could include reduced fitness as a result of dust or physical disturbance. Motorized and mechanized vehicle use within habitat for this species would be limited to designated open routes. Since all cross-country motorized or mechanized travel is prohibited, vehicle damage to plants away from routes would be unlikely.

Two mapped populations of September 11 stickleaf occur near existing routes. Under this alternative, all routes near these populations would remain open to public use, resulting in the potential for all of the impacts described above.

Animal Species

Ferruginous hawk

Roads may have little direct effect on ferruginous hawks but the indirect effects can be substantial. Nesting ferruginous hawks are sensitive to human disturbance and protection buffers of 250 meters (White and Thurow 1985) to 650 meters (Keeley and Bechard 2011) around nest sites have been proposed. Bechard, et al. (1990) found that ferruginous hawks chose nest sites further from roads than both red-tailed or Swainson's hawks. Ferruginous hawks nest and forage in open country but specific habitat for this species has not been modeled for the planning area and no known nest sites have been identified at this time. Ferruginous hawks may benefit from lower open road density which may reduce disturbance opportunities at potential nest sites, although no known nest sites occur within the planning area. This alternative would continue the current management of the transportation system in the planning area – the most routes would be designated open of all the alternatives, so potential disturbance to the species would be the most widespread. However, no new routes are proposed, so no new impacts are anticipated.

Northern goshawk

Although not considered a significant impact on populations, northern goshawks can be sensitive to human disturbance during the nesting season (Speiser 1992, Squires and Reynolds 1997). Little research has been conducted on the effect of road networks on goshawk habitat. One study conducted in California found that frequently occupied nesting territories tend to be found further from roads than infrequently occupied territories (Morrison et al. 2011). As described in Section 3.3.8.2, there are 7.51 miles of existing roads in ponderosa pine habitat within the planning area. This alternative would continue the current management of the transportation system in the planning area – all of the roads in this habitat type would remain open. However, there are no known nests in this area, so no disturbance to this species has been documented.

Sensitive Fish (Desert sucker, Flannelmouth sucker, Speckled dace, Virgin spinedace)

Open roads are not listed as a direct threat to these fish species but may act as access points that lead to indirect threats such as toxic spills, fires, or illegal dumping. As described in Section 3.3.8.1, the Virgin River Corridor ACEC (which was designated partially for the protection of Virgin River fishes, including desert sucker, flannelmouth sucker, speckled dace, and Virgin spinedace) contains 6.82 miles of existing routes; several of these routes serve as access points to the Virgin River. Under this alternative, all of these routes would remain open and would continue to provide access to the river. However, no new routes are proposed, so no new impacts are anticipated.

4.9.2 Impacts of Alternative B

4.9.2.1 Threatened, Endangered, Candidate and Proposed Species

Plant Species

Jones cycladenia

Under this alternative, all 0.25 miles of existing roads within the Lone Butte ACEC would be closed. Since there are no routes through Jones cycladenia habitat, visitors to the area are infrequent, and the plant grows on steep slopes in unstable soils, no effects to this species are expected from designation of the transportation system.

Gierisch Mallow

As stated previously, direct effects to Gierisch mallow from general use of the transportation system may occur since this species grows along roadsides. Increased human presence can lead to plants being stepped on and crushed. Under this alternative, 12.4 miles of road within the area where the Gierisch mallow is known to occur would be designated as closed (49 percent). These designations could potentially cause a reduction (as compared to Alternative A) in areas where indirect effects such as illegal off-road vehicle use, trash dumping, and the spread of invasive plants may occur.

Holmgren milk-vetch

Direct effects to Holmgren milk-vetch from general use of the transportation system are not likely to occur as this species does not grow in or adjacent to existing roadways, although presence can lead to plants being stepped on and crushed. Indirect effects could include reduced fitness as a result of dust or physical disturbance. Under this alternative, 0.9 miles of road within the Black Knolls ACEC would be designated as closed, leaving the remaining 1.7 miles as open or administrative only (where use would only be infrequent, and only allowed for authorized users). This would reduce the likelihood of the direct and indirect effects occurring, as compared to Alternative A.

Siler pincushion cactus

Under this alternative, 41.5 miles (57.6 percent) of routes within the Fort Pearce and Lost Spring Mountain ACECs would be designated as closed, leaving the remaining 30.6 miles as open or available for administrative use only. Of the 1.4 miles of routes within the mapped range of the cactus, 1.25 miles (89 percent) would be designated as closed, with the remainder designated for administrative use only. Since all cross-country motorized or mechanized travel is prohibited, vehicle damage to plants away from routes would be unlikely, although vehicles could still injure or kill plants by pulling off the roadway to park or turn around within the habitat.

Fickeisen plains cactus

Motorized and mechanized vehicle use within Fickeisen cactus habitat would be limited to routes designated as open. Since all cross-country motorized or mechanized travel would be prohibited, vehicle damage to plants away from routes is not anticipated. Indirect effects could include reduced fitness as a result of dust or physical disturbance. Under this alternative, no routes within the proposed critical habitat would be closed while approximately .4 miles (16 percent) of existing routes would be designated for administrative use only. The remaining 2.1 miles (84 percent) of existing routes would be designated open for motorized/mechanized use. Impacts would therefore be very similar to those described for Alternative A except that there would be less (i.e., less frequent) use on the roads designated for administrative use. This would result in less potential dust on plants near these routes.

Animal Species

Desert Tortoise

Alternative B would result in the closure of the most routes through desert tortoise habitat. In desert tortoise ACECs, Alternative B would reduce open road density by 53 percent (from 1.98 miles/mile² to .93) – see Table 4.21. A 47 percent reduction in road density would occur in critical habitat (from 1.6 to .85 mi/mi²).

Table 4.21. Road Data Within Desert Tortoise ACECs and Critical Habitat – Alternative B

Desert Tortoise ACECs	Miles	Road Density
Administrative Use Only	76.89	.54
Closed to All Motorized Use	151.40	
Open to All Users	55.15	.39
Open to All Users for ATV or Motorcycle Use	0	
Open to All Users for Non-Motorized Uses	0	
Open and Administrative Use	132.04	.93
Open	55.15	.39

Desert Tortoise Critical Habitat	Miles	Road Density
Administrative Use Only	70.68	.49
Closed to All Motorized Use	107.21	
Open to All Users	52.21	.36
Open to All Users for ATV or Motorcycle Use	0	
Open to All Users for Non-Motorized Uses	0	
Open and Administrative Use	122.89	.85
Open	52.21	.36

Virgin River Chub and Woundfin

As shown in Table 4.22, density of open and administrative roads within the Virgin River Corridor ACEC would be reduced by 69.7 percent (from 2.11 to .64 mi/mi²). Reducing the number of routes that access the Virgin River may reduce opportunities for these indirect effects to occur.

Table 4.22. Road Data Within the Virgin River Corridor ACEC – Alternative B

Proposed Route Designation	Miles of Road	Road Density (Miles/Mile ²)
Administrative Use Only	1.51	.47
Open	.56	.17
Open + Administrative	2.07	.64
Closed	5.82	
Non-motorized Use Only	0	

Southwestern Willow Flycatcher

As shown in Table 4.23, open road density within the potential habitat category would be reduced from 2.94 to .9 miles/mile² (69.4 percent reduction), while road density in suitable habitat would be reduced from 3.82 to .64 miles/mile² (83.2 percent reduction). As stated previously in the Virgin River fish discussion, road density in the Virgin River Corridor ACEC would be reduced by 69.7 percent. Reducing the number of open routes that access the Virgin River may reduce opportunities for the direct and indirect effects listed above to occur.

Table 4.23. Road Data Within Southwestern Willow Flycatcher Habitat – Alternative B

Habitat Type	Designation	Miles of Road	Road Density (miles/mile²)
Potential	Open	.3	.19
	Open/Admin	1.4	.9
Suitable	Open	0	0
	Open/Admin	.07	.64

Yellow-billed cuckoo

Under this alternative, the one route that directly accesses the Beaver Dam Wash/Virgin River confluence area is proposed to be closed while the route that accesses Mormon Well would be designated for administrative use only. Closing the confluence route would possibly benefit yellow-billed cuckoos by reducing disturbance levels and reducing the potential for trampling and loss of vegetation, soil compaction, impaired regeneration of riparian vegetation, and increased erosion. Limiting use of the Mormon Well access route to administrative uses only would minimize impacts to habitat due to their receiving limited, infrequent use. Both of these designations (closed and limited to administrative use) would result in less trash, pollution, and human waste (which may also degrade habitat), as well as a decrease in the risk of human-caused fire.

California condor

Individual California condors may be injured or killed by collision with vehicles on open roads, especially if road kill is present. While the potential exists for California condors to collide with virtually any type of vehicle on the ground, the likelihood of such an occurrence is considered rare in the planning area because of the lack of high-speed roads under BLM jurisdiction and the scarcity of condors using this portion of the Arizona Strip. Indirect effects may occur from the ingestion of microtrash left at campsites or other areas of human use.

4.9.2.2 Sensitive Species

Plant Species

Sticky wild buckwheat

Since this alternative would designate all routes near the known populations of this species open to public use, impacts would be the same as those described for Alternative A.

Three-cornered milkvetch

Since this alternative would designate the road where the mapped population of this species occurs as open to public use, impacts would be the same as those described for Alternative A.

September 11 stickleaf

Since this alternative would designate all routes near the known populations of this species open to public use, impacts would be the same as those described for Alternative A.

Animal Species

Ferruginous hawk

Impacts would be similar to those described for Alternative A, except that fewer roads would be designated as open under this alternative. Ferruginous hawks may benefit from lower open road density which may reduce disturbance opportunities at potential nest sites.

Northern goshawk

Under this alternative, road density within ponderosa pine forest would be reduced by 27.5 percent. Northern goshawks may benefit from lower road density which may reduce disturbance opportunities at potential nest sites.

Table 4.24. Road Data Within Ponderosa Pine Habitat – Alternative B

Proposed Designation	Miles of road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
Open	3.58	.66	-52.2%
Open & Admin.	5.46	1.00	-27.5%

Sensitive Fish (Desert sucker, Flannelmouth sucker, Speckled dace, Virgin spinedace)

As discussed above (for Virgin River chub and woundfin) and shown in Table 4.22, open road density within the Virgin River Corridor ACEC would be reduced by 69.7 percent (from 2.11 to .64 mi/mi²). Reducing the number of routes that access the Virgin River may reduce opportunities for these indirect effects to occur.

4.9.3 Impacts of Alternative C – Proposed Action

4.9.3.1 Threatened, Endangered, Candidate and Proposed Species

Plant Species

Jones Cycladenia

Under this alternative, 0.12 miles of the .25 miles of road within the Lone Butte ACEC would be closed with the remainder open to administrative use only. However, since there are no routes through Jones cycladenia habitat, visitors to the area are infrequent, and the plant grows on steep slopes in unstable soils, no effects to this species are expected from designation of this proposed transportation system.

Gierisch Mallow

Under this alternative, 7.6 miles of road within the known area where the Gierisch mallow occurs would be designated as closed (30 percent). These designations could potentially cause a reduction (as compared to the current situation) in areas where indirect effects such as illegal off-road vehicle use, trash dumping, and the spread of invasive plants may occur.

Holmgren Milk-vetch

Under this alternative, .66 miles of road within the Black Knolls ACEC would be designated as closed, leaving the remaining 1.94 miles as open or administrative only (where use would only be infrequent). This would reduce the likelihood of the direct and indirect effects occurring, as compared to Alternative A.

Siler Pincushion Cactus

Under this alternative, 23.68 miles of routes within the Fort Pearce and Lost Spring Mountain ACECs would be designated as closed (33 percent of the total routes), leaving the remaining 48.42 miles as open or administrative use only. Of the 1.4 miles of routes within the mapped range of the cactus, 1.25 miles (89 percent) would be designated as closed. Since all cross-country motorized or mechanized travel is prohibited, vehicle damage to plants away from routes would be unlikely. Vehicles could still injure or kill plants by pulling off the roadway to park or turn around within the habitat.

Fickeisen Plains Cactus

Impacts would be the same as those described for Alternative B.

Animal Species

Desert Tortoise

Alternative C would result in the closure of specific routes through desert tortoise habitat. In desert tortoise ACECs, Alternative C would reduce open road density by 30 percent (from 1.98 miles/mile² to 1.39) – see Table 4.25. A 26 percent reduction would occur in critical habitat (1.6 to 1.18 miles/mile²). This would reduce the potential for adverse impacts as compared to Alternative A.

Table 4.25. Road Data Within Desert Tortoise ACECs and Critical Habitat – Alternative C

Desert Tortoise ACECs	Miles	Road Density
Administrative Use Only	30.66	0.21
Closed to All Motorized Use	84.11	
Open to All Users	156.66	1.10
Open to All Users for ATV or Motorcycle Use	11.50	0.08
Open to All Users for Non-Motorized Uses	0.53	
Open and Admin	198.82	1.39
Open	168.16	1.18

Desert Tortoise Critical Habitat	Miles	Road Density
Administrative Use Only	35.52	.25
Closed to All Motorized Use	59.34	
Open to All Users	128.31	.89
Open to All Users for ATV or Motorcycle Use	6.16	.04
Open to All Users for Non-Motorized Uses	0.76	
Open and Admin	169.99	1.18
Open	134.47	0.93

Virgin River Chub and Woundfin

As shown in Table 4.26, density of open and administrative routes within the Virgin River Corridor ACEC would be reduced by 44 percent (from 2.11 to 1.19 mi/mi²). This would reduce the potential for adverse impacts as compared to Alternative A.

Table 4.26. Road Data Within the Virgin River Corridor ACEC – Alternative C

Proposed Route Designation	Miles of Road	Road Density (Miles/Mile ²)
Administrative Use Only	1.41	.44
Open	2.42	.75
Open + Administrative	3.83	1.19
Closed	2.98	
Non-motorized Use Only	1.07	

Southwestern Willow Flycatcher

As shown in Table 4.27, density of open routes within the potential habitat category would be reduced from 2.94 to 1.41 miles/mile² (52 percent reduction), while road density in the suitable category would be reduced from 3.82 to 2.36 miles/mile² (38.2 percent reduction). As stated previously in the Virgin River fish discussion, road density in the Virgin River Corridor ACEC would be reduced by 44 percent. Reducing the number of open routes that access the Virgin River may reduce opportunities for the direct and indirect effects described for Alternative A to occur.

Table 4.27. Road Data Within Southwestern Willow Flycatcher Habitat – Alternative C

Habitat Type	Designation	Miles of Road	Road Density (miles/mile ²)
Potential	Open	1.41	0.9
	Open/Admin	2.2	1.41
Suitable	Open	0.12	1.09
	Open/Admin	0.26	2.36

Yellow-billed Cuckoo

The one route that directly accesses the Beaver Dam confluence area is proposed to be closed while the route that accesses Mormon Well would be left open. Closing the confluence route would possibly benefit yellow-billed cuckoos by reducing disturbance levels and reducing the potential for trampling and loss of vegetation, soil compaction, impaired regeneration of riparian vegetation, and increased erosion. Habitat at Mormon Well is remote and sees little extended vehicle use and therefore would see negligible impacts from this alternative.

California Condor

Impacts from this alternative would be the same as those described for Alternative B.

4.9.3.2 Sensitive Species

Plant Species

Sticky wild buckwheat

Impacts would be the same as those described for Alternative A.

Three-cornered milkvetch

Impacts would be the same as those described for Alternative A.

September 11 stickleaf

Impacts would be the same as those described for Alternative A.

Animal Species

Ferruginous Hawk

Impacts would be similar to those described for Alternative A, except that fewer roads would be designated as open under this alternative. Ferruginous hawks may benefit from lower open road density which may reduce disturbance opportunities at potential nest sites.

Northern Goshawk

Impacts from this alternative would be similar to those described for Alternative B, except that fewer roads would be designated as open under this alternative. Under this alternative road density within ponderosa pine forest would be reduced by 16 percent (see Table 4.28).

Table 4.28. Road Data Within Ponderosa Pine Habitat – Alternative C

Proposed Designation	Miles of road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
Open	5.77	1.06	-23.2%
Open & Admin.	6.33	1.16	-16%

Sensitive Fish (Desert sucker, Flannelmouth sucker, Speckled dace, Virgin spinedace)

As discussed above (for Virgin River chub and woundfin) and shown in Table 4.26, open road density within the Virgin River Corridor ACEC would be reduced by 44 percent (from 2.11 to 1.19 mi/mi²). Reducing the number of routes that access the Virgin River may reduce opportunities for these indirect effects to occur.

4.9.4 Impacts of Alternative D

4.9.4.1 Threatened, Endangered, Candidate and Proposed Species

Plant Species

Jones Cycladenia

Under this alternative, 0.12 miles of the .25 miles of road within the Lone Butte ACEC would be closed with the remainder open to administrative use only. However, since there are no routes through Jones cycladenia habitat, visitors to the area are infrequent, and the plant grows on steep slopes in unstable soils, no effects to this species are expected from designation of this proposed transportation system.

Gierisch Mallow

Under this alternative, 4 miles of road within the area where the Gierisch mallow is known to occur would be designated as closed (16 percent of the total roads). These designations could potentially cause a reduction (as compared to the current situation) in areas where indirect effects such as illegal off-road vehicle use, trash dumping, and the spread of invasive plants may occur.

Holmgren Milk-vetch

Under this alternative, .16 miles of road within the Black Knolls ACEC would be designated as closed, leaving the remaining 2.44 miles as open or administrative only (where use would only be infrequent). This would reduce the likelihood of the direct and indirect effects occurring, as compared to Alternative A.

Siler Pincushion Cactus

Under this alternative, 8 miles of routes within the Fort Pearce and Lost Spring Mountain ACECs would be designated as closed (33 percent of the total routes), leaving the remaining 48.42 miles as open or administrative use only. Of the 1.4 miles of routes within the mapped range of the cactus, 1.25 miles (89 percent) would be designated as closed. Since all cross-country motorized or mechanized travel is prohibited, vehicle damage to plants away from routes would be unlikely. Vehicles could still injure or kill plants by pulling off the roadway to park or turn around within the habitat.

Fickeisen Plains Cactus

Impacts would be the same as those described for Alternative A.

Animal Species

Desert Tortoise

Alternative D would result in the closure of specific routes through desert tortoise habitat. In desert tortoise ACECs, Alternative D would reduce open road density by 16 percent (from 1.98 miles/mile² to 1.66) – see Table 4.29. A 21 percent reduction would occur in critical habitat (1.6 miles/mile² to 1.26) as compared to the current situation. This would reduce the potential for adverse impacts as compared to Alternative A.

Table 4.29. Road Data Within Desert Tortoise ACECs and Critical Habitat – Alternative D

Desert Tortoise ACECs	Miles	Road Density
Administrative Use Only	11.60	.08
Closed to All Motorized Use	45.51	
Open to All Users	205.27	1.44
Open to All Users for ATV or Motorcycle Use	21.07	.15
Open to All Users for Non-Motorized Uses	0	
Open and Admin	237.94	1.66
Open	226.34	1.58

Desert Tortoise Critical Habitat	Miles	Road Density
Administrative Use Only	17.53	.12
Closed to All Motorized Use	32.22	
Open to All Users	150.54	1.04
Open to All Users for ATV or Motorcycle Use	13.07	.09
Open to All Users for Non-Motorized Uses	0	
Open and Admin	181.14	1.26
Open	163.61	1.14

Virgin River Chub and Woundfin

As shown in Table 4.30, density of open and administrative roads within the Virgin River Corridor ACEC would be reduced by 25.6 percent (from 2.11 to 1.57 mi/mi²) as compared to the current situation. This would reduce the potential for adverse impacts as compared to Alternative A.

Table 4.30. Road Data Within the Virgin River Corridor ACEC – Alternative D

Proposed Route Designation	Miles of Road	Road Density (Miles/Mile²)
Administrative Use Only	.60	.19
Open	4.46	1.38
Open + Administrative	5.06	1.57
Closed	1.76	
Non-motorized Use Only	1.07	

Southwestern Willow Flycatcher

As shown in Table 4.31, density of roads open to the public and limited to administrative use within the potential habitat category would be reduced from 2.94 to 1.81 miles/mile² (a 38.4 percent reduction), while road density in suitable habitat would be reduced from 3.82 to 3.55 miles/mile² (a 7.1 percent reduction). As stated previously in the Virgin River fish discussion, road density in the Virgin River Corridor ACEC would be reduced by 25.6 percent. Reducing the number of open routes that access the Virgin River may reduce opportunities for the direct and indirect effects listed above to occur.

Table 4.31. Road Data Within Southwestern Willow Flycatcher Habitat – Alternative D

Habitat Type	Designation	Miles of Road	Road Density (miles/mile²)
Potential	Open	2.29	1.47
	Open/Admin	2.82	1.81
Suitable	Open	.39	3.55
	Open/Admin	.39	3.55

Yellow-billed Cuckoo

Since both routes accessing yellow-billed cuckoo habitat would remain open in this alternative, impacts would be the same as those described for Alternative A.

California Condor

Impacts from this alternative would be the same as those described for Alternative B.

4.9.4.2 Sensitive Species

Plant Species

Sticky wild buckwheat

Impacts would be the same as those described for Alternative A.

Three-cornered milkvetch

Impacts would be the same as those described for Alternative A.

September 11 stickleaf

Impacts would be the same as those described for Alternative A.

Animal Species

Ferruginous Hawk

Impacts would be similar to those described for Alternative A, except that fewer roads would be designated as open under this alternative. Ferruginous hawks may benefit from lower open road density which may reduce disturbance opportunities at potential nest sites.

Northern Goshawk

Impacts from this alternative would be similar to those described for Alternative A except that density of open roads (this includes both open for public use and administrative use) within ponderosa pine forest under this alternative would be reduced by 11.6 percent - see Table 4.32.

Table 4.32. Road Data Within Ponderosa Pine Habitat – Alternative D

Proposed Designation	Miles of road	Road Density (miles/mile ²)	Change in Road Density (from existing condition)
Open	6.4	1.17	-15.2%
Open & Admin.	6.65	1.22	-11.6%

Sensitive Fish (Desert sucker, Flannelmouth sucker, Speckled dace, Virgin spinedace)

Impacts from this alternative would be similar to those described for Alternative A except that density of open roads (which includes both open for public use and administrative use) within the Virgin River Corridor ACEC would be reduced by 25.6 percent (from 2.11 to 1.57 mi/mi²) – see Table 31 .

4.10 WILDERNESS CHARACTERISTICS

Within the planning area, there are some routes proposed open to all motorized users within wilderness characteristics areas (see Table 4.33 below). These routes occur in the Lime Kiln Mountain and Virgin Peak Ridge areas of the Littlefield Sub-region.

Table 4.33. Route Designations in Wilderness Characteristics Areas				
Route Designation	Alternative			
	A – No Action	B	C – Proposed Action	D
Open to All Users	5.1 miles	0.0	1.3 miles	1.3 miles
Open for Non-Motorized Use	0.7 miles	0.7 miles	1.4 miles	1.4 miles
Limited to Authorized Uses	0.0	0.5 miles	0.5 miles	0.5 miles
Closed to All Motorized and Mechanized Use	0.0	4.6 miles	2.7 miles	2.7 miles

4.10.1 Impacts of Alternative A – No Action

Under Alternative A, most routes (88 percent) within lands managed to maintain wilderness characteristics would remain open either to all users (5.1 miles); the remaining 0.7 miles would be for non-motorized use only. As stated above, all of these routes are in either the Lime Kiln Mountain or Virgin Peak Mountain Wilderness Characteristics areas south of Scenic, Arizona along the ridge of the Virgin Mountains (see Figure 3.3.9-1).

4.10.2 Impacts of Alternative B

Under Alternative B, all of the routes in the wilderness characteristics area would be designated for non-motorized, non-mechanized use (91 percent), or only available for authorized users, which would likely involve use of motorized vehicles. No routes would be open for public motorized use. Impacts to

wilderness characteristics areas would therefore be minimally impacted by motorized uses under this alternative because administrative uses would only receive limited, infrequent use. This alternative would provide the most beneficial impact to wilderness characteristics.

4.10.3 Impacts of Alternative C – Proposed Action

In Alternative C, a mix of routes would be available for public motorized use (22 percent of existing routes) and routes that would be closed (46 percent of existing routes). An additional 0.5 miles of routes (8 percent) would only be available for authorized users (receiving only limited, infrequent use), and 1.4 miles (24 percent) would be designated for non-motorized use only. Impacts to wilderness characteristics areas would therefore be less than those proposed under Alternative A and more than those proposed under Alternative B.

4.10.4 Impacts of Alternative D

Impacts would be the same as those described for Alternative C.

4.11 CUMULATIVE IMPACTS

“Cumulative impacts” are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions. This EA attempts to qualify and quantify the impacts to the environment that would result from the incremental impact of the proposed action or alternatives when added to other past, present, and reasonably foreseeable future actions. These impacts can result from individually minor but collectively important actions taking place over a period of time.

There are a wide variety of uses and activities occurring on the lands within and adjacent to the planning area, including livestock grazing, hiking, mining, etc. Specific actions that are occurring, or are likely to occur in the reasonably foreseeable future are:

- *Livestock grazing* – The planning area (and much of the adjacent area) is within active grazing allotments. Each of these allotments is managed under a grazing system that is documented and described in an allotment management plan. Livestock grazing has occurred in the area for 150+ years.
- *Mining and Mineral Resources* – Public lands outside designated wilderness are open to mineral development (see below for a discussion on the Northern Arizona Mineral Withdrawal). The primary economic mineral resource in the area consists of locatable mineral deposits, including breccia pipe deposits (i.e., vertical collapse features formed from the collapse of karst solution caverns in the underlying Redwall limestone). A variety of precious metals (including copper, gold, and silver) are found within breccia pipes. However, it is the presence of uranium minerals within breccia pipes that has been of the most interest over the past half century.

Other potential mineral resources are leasable minerals (including coal, oil and gas, and geothermal resources) and salable minerals (consisting primarily of sand, stone and gravel). The potential for leasable minerals in the planning area areas is low; the potential for gravel is high. Several existing mineral material pits occur.

- *Northern Arizona Mineral Withdrawal* – On January 9, 2012, the Secretary of the Interior issued a decision to withdraw approximately 1 million acres of Federal locatable minerals in northern

Arizona from the location of new mining claims under the Mining Law of 1872 [30 USC 22–54] (Mining Law), subject to valid existing rights. The affected lands are located near Grand Canyon National Park in northern Arizona, and consist of lands managed by the BLM and the U.S. Forest Service. The decision to withdraw these lands was made in order to protect the Grand Canyon watershed from adverse effects of locatable mineral exploration and development. The withdrawal does not affect use, management, or disposition of the lands other than under the Mining Law. The withdrawn lands on the Arizona Strip are on the Uinkaret Plateau, Kanab Plateau, and House Rock Valley, south and east of the Littlefield, St. George Basin, and Colorado City sub-regions.

- *Proposed Lake Powell Pipeline* – The Utah Board of Water Resources proposes to construct a 69-inch water pipeline from Lake Powell to Sand Hollow Reservoir (near St. George, Utah). In addition to the pipeline, there would be pump stations, control structures, peaking reservoirs, and hydroelectric plants. Transmission lines or a natural gas pipeline would be needed to power the pumping plants and transmit power generated at the hydroelectric power plants. The proposed pipeline would deliver 80,000 acre-feet of water to Kane and Washington counties per year. The proposed pipeline route would generally follow U.S. Highway 89 from Lake Powell until a few miles east of Kanab, where it would then drop south onto the Arizona Strip and generally follow the designated utility corridor to a location south of Colorado City, where it would then turn north back into Utah. The portion of the proposed route that is south of the Kaibab Paiute Reservation to around Colorado City is within the Colorado City Sub-region.
- *Regional Community Growth* – The adjacent southwestern Utah and southeastern Nevada communities are expected to continue to grow resulting in more local residents recreating in and using surrounding public lands, such as the Arizona Strip. According to the 2010 U.S. Census, the Dixie Metropolitan Planning Organization (DPO), covering the communities of Ivins, Santa Clara, St. George and Washington, Utah and immediately adjacent unincorporated areas of Washington County, Utah, had a population of 104,414. The nearby communities of Hurricane, La Verkin, Toquerville, and Leeds, Utah, also continue to grow at the same pace as the DPO. According to the Utah Governor’s Office of Planning and Budget (GOPB), the DPO population is expected to grow to over 170,000 by 2020; to over 250,000 by 2030; and to 400,000 by 2040. The 2010 census places the population of Mesquite, Nevada at 19,068 with commensurate growth expected here as in the nearby DPO in Utah.

4.11.1 Air Quality

Air quality within the planning area is influenced by a large geographic area, including northwestern Arizona, southern sections of Utah, southeastern sections of Nevada, and even southern California. This region influences the planning area’s air quality due to regional haze from smog and dust. High rates of population growth in the region would increase the amount of regional haze affecting the planning area. Construction of projects such as the Lake Powell Pipeline, the Southern Corridor (which would be just over the Utah state line from the planning area, and is in the process of being constructed), as well as increased use of Interstate 15 and other regional roads and highways would increase vehicle emissions and add to the regional haze that is blown into the planning area.

Increased population in the region would also result in increased levels of visitors to the planning area who travel on the mostly dirt and gravel roads. Such increased use would result in elevated levels of fugitive dust, as well as vehicle emissions in concentrated-use areas. Continuing gypsum and uranium mining in the region, as well as use of mineral material sites in the area, would also result in elevated levels of fugitive dust in the area from on-site activities and haul road use. Future droughts would also

have long-term effects on air quality - as more vegetation cover disappears, more acres of soils would become susceptible to wind events that would produce elevated levels of dust. Continued grazing during a drought could decrease vegetative cover and powder surface soils.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles), it is anticipated that none of the alternatives would result in cumulative impacts to air quality when added to other past, present, and reasonably foreseeable activities in the planning area.

4.11.2 Cultural Resources

The increase in regional population and popularity of the planning area is correlated to an increase in damage to cultural resources from visitation, including that caused by vandalism. Mineral development, land use authorizations, and livestock grazing would continue to impact cultural resources. Conversely, additional public awareness of the potential irretrievable loss of open spaces and cultural resources may provide additional protection and more funding to conduct research and preserve these resources in the region.

Proposed actions by the Washington County Water Conservancy District such as the Lake Powell Pipeline would also cause direct and indirect long term impacts to cultural resources. Other actions proposed by local communities under R&PP leases/conveyances (due to community growth) could also impact these resources. However, these impacts could be mitigated under Section 106 of the NHPA.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles), it is anticipated that none of the alternatives would result in cumulative impacts to cultural resources when added to other past, present, and reasonably foreseeable activities in the planning area.

Resources of importance to American Indians

Increasing regional population and the resulting increase in visitation and use of the planning area would result in degradation of the vegetation in some areas and on some TCPs, as well as loss of the original landscape context, such as the natural quiet and isolation. This may affect some TCPs and interfere with some traditional uses. The creation of wilderness areas, national monuments, national parks, and other protected places in the surrounding area would offer long-term protection of traditional landscapes and allow traditional uses to continue in some areas.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles), it is anticipated that none of the alternatives would result in cumulative impacts to resources of importance to American Indians when added to other past, present, and reasonably foreseeable activities in the planning area.

4.11.3 Recreation

The geographic area for analysis of cumulative impacts is northwestern Arizona, southwestern Utah, and southeastern Nevada. Over time, continued population growth of the large and small communities in this area will contribute to greater visitation to the planning area. Additionally, the development of large blocks of Arizona and Utah State Trust lands in the area for residential, commercial, urban, and other community expansion purposes will shift much of the recreation use that currently takes place on those lands to adjacent public lands. This has already begun to occur as a result of construction of the new St. George Municipal Airport and the posting of "No Trespassing" signs on Arizona State Trust lands just

south of St. George. Such a shift will produce an increase in the creation of illegal routes and strong potential for shifting prescribed recreation settings toward more rural/urban character.

Extended drought conditions combined with construction activities (related to urban growth) and increased use of dirt roads in the region (related to the growing numbers of visitors) will contribute to more frequent and prolonged periods of fugitive dust and reduced access, which would affect the availability of recreation opportunities. Conversely, diligent application of Standards for Rangeland Health, reclamation practices, restoration projects, and the progression toward achieving desired future conditions for vegetation management will noticeably reduce the potential for fine soil particles to become airborne. Such practices will, if successful, improve scenic quality and enhance a variety of recreation settings.

Uranium extraction will shift the remoteness attribute of physical recreation settings and the encounters with others attribute of the social recreation settings via the construction and regular use of new routes in and around the planning area. As some shifting in the region occurs from agricultural-related businesses to recreation and tourism, some landscapes and recreation settings will be enhanced by the removal of unneeded structures. However, such a shift may create other impacts to recreation settings by providing for more structured recreation, accompanied by increased visitation. Management of areas such as wilderness, areas having wilderness characteristics, and various ACECs will contribute to maintaining or enhancing landscapes and recreation setting conditions on scattered, large tracts of public land.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles), it is anticipated that none of the alternatives would result in cumulative impacts to recreation when added to other past, present, and reasonably foreseeable activities in the planning area.

4.11.4 Soils

The soils in the area formed under conditions that had no vehicles or large numbers of large animals to impact them. Population growth, grazing, and developments in the past 150 years have resulted in soil disturbance on hundreds of thousands of acres at and near homesteads, communities, roads, and waters in the planning area. Continued population growth and the resulting growth in vehicle and OHV use and visitation in the region will continue to add to the acreage of soil disturbance. Continued AMP implementation, watershed plans, and the Standards and Guides process will continue to examine livestock grazing areas for impacts and will apply remedies to decrease compaction and erosion. Continued and/or additional gypsum mining would increase disturbance to soils. Exploration or production of uranium will increase soil disturbance on access roads and at mine sites. Reclamation would stabilize the replaced soils. Additional droughts could reduce overall vegetative cover making soils more susceptible to erosion, especially where there is surface disturbance. Wildfire would continue to make soils more susceptible to erosion. Soil protection and salinity control projects (such as the Fort Pearce Community Watershed Plan) would continue to control floods, reduce erosion, reduce downstream peak flow, protect microbiotic soils, and trap saline sediments.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles), it is anticipated that none of the alternatives would result in cumulative impacts to soils when added to other past, present, and reasonably foreseeable activities in the planning area.

4.11.5 Vegetation

Vegetation on the Arizona Strip has gone through significant changes since the 1870s due to historic land use practices and the introduction of non-native species. Livestock grazing would continue across the entire planning area. The Standards and Guidelines analysis and permit renewal process would help ensure grazing practices are conducted in a manner to maintain or improve the ecological health of the area. Rangeland management practices would act to prevent and control the spread of invasive plant species, maintain diverse and natural plant communities, improve wildlife habitat, reduce erosion, and improve water quality. The objectives developed to manage for healthy rangelands have a goal of keeping the entire ecosystem healthy and productive in order to ensure that it yields both usable products and intrinsic values.

Continuing gypsum and uranium mining in the region, as well as use of mineral material sites in the area, would cumulatively affect vegetation through the loss of vegetation, higher rates of erosion and sedimentation in drainages/waterways, increased deposition of dust on vegetation adjacent to roadways (i.e., haul routes), and introduction and spread of invasive plants. Reclamation activities would counter some of the reduction in vegetative cover, and preventative measures to inhibit the spread of invasive species could curtail infestation by species such as Scotch thistle.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles), it is anticipated that none of the alternatives would result in cumulative impacts to vegetation resources when added to other past, present, and reasonably foreseeable activities in the planning area.

4.11.6 Wetlands/Riparian Zones

Riparian zones on the Arizona Strip have gone through significant changes since the 1870s due to historic land use practices (including livestock grazing) and the introduction of non-native species. Livestock grazing would continue across the entire planning area. The Standards and Guidelines analysis and permit renewal process would help ensure grazing practices are conducted in a manner to maintain or improve the ecological health of the wetlands and riparian areas, i.e., productive and diverse riparian-wetland communities of native species exist and are maintained. Management practices would also act to prevent and control the spread of invasive plant species, maintain diverse and natural plant communities, improve wildlife habitat, reduce erosion, and improve water quality. The objectives developed to manage for properly functioning wetland/riparian zones when adequate vegetation, land form, or large woody debris is present to dissipate stream energy associated with high water flows.

Tamarisk, commonly known as salt cedar, is an exotic (non-native) shrub or tree that grows in dense stands along rivers and streams in the west. Tamarisk is a native of Eurasia, and was introduced to the U.S. in the 19th century for horticulture and as an erosion control agent. It has spread throughout the west, overtaking western rivers (including over 10,000 acres of the Virgin River from Zion to Lake Mead) and causing major changes to natural environments. The impacts caused by tamarisk in the southwest are well documented. These prolific non-native shrubs displace native vegetation and animals, alter soil salinity, and increase fire frequency. Tamarisk is an aggressive competitor, often developing monoculture stands and lowering water tables, which can adversely affect wildlife and native vegetative communities. In many areas, it occupies previously open spaces and is adapted to a wide range of environmental conditions. Once established in an area, it typically spreads and persists.

To reduce tamarisk leaf cover along the Virgin River, the tamarisk leaf beetle (*Diorhabda elongate*), was released along the Virgin River in St. George in 2006. The tamarisk leaf beetle scrapes the foliage,

causing it to dry out, but it takes several years to kill the weed. While long-term benefits of tamarisk control are anticipated, there are concerns that if tamarisk is removed, habitat for willow flycatchers and other wildlife species will not be replaced with native vegetation because of the extremely alkaline soil that can be left behind by the tamarisk.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles, including in riparian areas), it is anticipated that none of the alternatives would result in cumulative impacts to wetlands/riparian zones when added to other past, present, and reasonably foreseeable activities in the planning area.

4.11.7 Wildlife, Including Big Game and Migratory Birds

Development pressure exists throughout the southwestern U.S., particularly in and adjacent to sources of water. As a result, community expansion has had adverse impacts on wildlife resources. Community expansion has also led to increased pressure for water and developable lands. Land disposals have reduced available wildlife habitat outside of ACECs/critical habitat in the Mojave Desert portion of the planning area by up to 400 acres since 1973. Issuance of rights-of-way outside of ACECs/critical habitat has also reduced these habitats by as much as 1,859 acres over the same time period. Acquisition of sensitive habitats within ACECs/critical habitat is identified as a priority in the Arizona Strip Field Office RMP as this would increase protection of the species by shifting management emphasis toward conservation.

Demand for water for industrial, irrigation, and culinary use has had major long-term impacts on wildlife resources. Disruptions of flow regimes from dams and diversions have altered habitat for riparian dependent species. Introduction of non-native plants and animals have resulted in impacts from competition for resources, trampling, predation, injury, and death. Increased demand for land for community services and recreational uses is anticipated, particularly in the area around Mesquite and Littlefield/Beaver Dam, and impacts would continue to increase at modest levels.

Mineral development has led to reduction of habitat quality and physical disturbance in a variety of habitats. Wildfires have reduced available Mojave Desert habitat by many thousands of acres through conversion of the vegetation from native communities to exotic annual grasses. Livestock grazing related activities have increased the possibility of some wildlife species being trampled. During years of drought and/or low productivity, livestock grazing can reduce forage availability for species that share habitats with them. Seasonal grazing restrictions limit both the extent and duration of impacts.

Recreational pursuits, particularly OHV use, have caused disturbance to most species and their habitats. With the increase in local populations has come a dramatic increase in the level of OHV use, resulting in increased disturbance, injury, and mortality to wildlife, particularly ground dwelling species with low mobility. Transportation corridors exist through the habitat of virtually all species found within the planning area. Impacts vary by species and by the location, level of use, and speed of travel over the road.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles), it is anticipated that none of the alternatives would result in cumulative impacts to wildlife when added to other past, present, and reasonably foreseeable activities in the planning area.

4.11.8 Special Status Species

The distribution of several listed species extends well beyond the planning area boundary. For example, Siler pincushion cactus is also found in portions of southern Utah; desert tortoise range widely across the

Mojave Desert; southwestern willow flycatcher and yellow-billed cuckoo are found in riparian habitats throughout the southwest; and Mexican spotted owls may be found in canyon and mixed conifer forests throughout the region. Activities that occur virtually anywhere within the Virgin River watershed have the potential to affect woundfin, Virgin River chub, and other native fishes.

Among the contributing factors in the decline of most or all of these species is the loss or fragmentation of available habitat. Because the planning area is at the edge of several major physiographic regions, most of the listed species found here are at the edge of their range. Most of these species depend upon rare or unique habitats, such as riparian areas for southwestern willow flycatcher, the Virgin River for woundfin and Virgin River chub, and the Mojave Desert for desert tortoise. Most listed plant species have very narrow habitat requirements and are not able to grow or survive outside of these areas. Development pressure exists throughout the southwestern U.S., particularly in and adjacent to sources of water. As a result, community expansion has had adverse effects on special status species.

Community expansion has also led to increased pressure for water and developable lands. Land disposals outside of ACECs/critical habitat have reduced available desert tortoise habitat by up to 400 acres since 1973. Issuance of rights-of-way outside of ACECs/critical habitat has also reduced tortoise habitat by as much as 1,859 acres over the same time period. Acquisition of special status species habitat within ACECs is identified as a priority in the Arizona Strip Field Office RMP as this would increase protection of the species by shifting management emphasis toward conservation. Demand for water for industrial, irrigation, and culinary use has had major long-term effects on special status fish. Disruptions of flow regimes from dams and diversions have altered habitat for fish and riparian dependent species. Reductions in water quality have had similar long-term effects. Water use in the region would continue to increase, affecting flows in the Virgin River and continuing to cause a decline in populations of woundfin and Virgin River chub.

Introduction of non-native plants and animals have resulted in adverse effects to listed species from competition for resources, trampling, predation, injury, and death. Tamarisk invasion in riparian areas has resulted in reductions of flow for native fishes, reductions in the overall size of the vegetative community, increased temperature and salinity, and increased risk of fire. However, the invasion of tamarisk has also increased available nesting habitat for southwestern willow flycatcher. There are ongoing discussions about treatment of tamarisk along the Virgin River, but there are concerns that if tamarisk is removed, habitat for willow flycatchers and other riparian dependent species would not be replaced with native vegetation because of the extremely alkaline soil that can be left behind by the tamarisk.

Wildfires have affected the quality of desert tortoise habitat on the Virgin Slope through conversion of the vegetation from native communities to exotic annual grasses. Mineral development has led to reduction of habitat quality and physical disturbance in special status species habitats. During years of drought and/or low productivity, livestock grazing can reduce forage availability for desert tortoise, although all desert tortoise habitat in the planning area has seasonal grazing restrictions. These actions have reduced or eliminated competition with livestock in these areas.

Recreational pursuits, particularly OHV use, have caused disturbance to most species and their habitats. With the increase in local populations has come a dramatic increase in the level of OHV use, resulting in increased disturbance, injury, and mortality to listed plants and ground dwelling species with low mobility. Transportation corridors cross through the habitat of virtually all listed species found within the planning area. Adverse effects vary by species and by the location, level of use, and speed of travel over the road.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles), it is anticipated that none of the alternatives would result in cumulative impacts to special status species when added to other past, present, and reasonably foreseeable activities in the planning area.

4.11.9 Wilderness Characteristics

Wilderness characteristics are primarily affected by the number and proximity of motorized travel corridors; the volume and type of traffic on those corridors; and the quantity and type of recreational users. To a lesser extent, range management projects can affect areas with wilderness characteristics. These impacts normally come from vegetation treatments and the installation, maintenance, and use of water catchments and other range improvements.

Population growth and the resulting increase in recreational use are expected to eventually impact lands with wilderness characteristics. An increase in motorized and non-motorized use could have major impacts on solitude, naturalness, and opportunities for primitive/unconfined recreation.

Given the fact that none of the alternatives propose to increase the number of miles of roads (and each of the action alternatives proposes to reduce total miles, including within lands managed for wilderness characteristics), it is anticipated that none of the alternatives would result in cumulative impacts to wilderness characteristics when added to other past, present, and reasonably foreseeable activities in the planning area.

Chapter 5

CONSULTATION AND COORDINATION

5.1 Introduction

The issue identification section of Chapter 1, as well as Table 3.2, identifies those issues analyzed in detail in Chapter 4. Table 3.2 also lists all resources/elements of the human environment that have been considered by BLM resource specialists to determine whether they would be potentially affected by the proposed action; this table provides the rationale for resources/elements that were considered but not analyzed further. The issues were identified through the public and agency involvement process described in section 5.2 below.

5.2 Summary of Public Participation

This section summarizes the process used to involve individuals, organizations, tribes, and government agencies in the preparation of this EA. A letter invited the public to initial scoping meetings for this TMP EA in April 2011. These public scoping meetings were held in the following locations:

April 18	Beaver Dam, Arizona	Beaver Dam Fire Station, 630 N. Highway 91
April 19	Kaibab Village, Arizona	Kaibab Village Community Center north of Pipe Springs
April 20	Colorado City, Arizona	Mohave Community College, Room 103
April 21	St. George, Utah	Dixie Center, 1835 Convention Center Drive

Scoping comments were received from the Wilderness Society, the Capital Trail Vehicle Association, the Center for Desert Archaeology, the City of Mesquite and the Town of Colorado City as well as from several private citizens.

Additionally, individual meetings to discuss the TMP EA were held in 2012 and 2013 with the AGFD, Mohave County Board of Supervisors, Kane County Commissioners, Washington County Commissioners, Virgin River Communities Board Meeting, Town Council of Colorado City, Town Council of Hildale, Centennial Park Political Action Committee, Fredonia Town Council, Kaibab Paiute Tribe, Arizona Grazing Advisory Board, individual livestock grazing permittees and individual county supervisors and commissioners. Presentations were made to the Arizona Resource Advisory Council, the Southwest Utah Planning Authorities Council, and the Utah Congressional Delegation.

Adjacent agency and tribal review, which entailed review of GIS route data as it crossed jurisdictional boundaries, was conducted in 2012 with the Arizona State Land Department, Mohave County, Utah State Institutional Trust Lands, Utah Public Lands Policy Coordination Office, Washington County, Las Vegas Field Office BLM, St. George Field Office BLM, Kanab Field Office BLM, and Caliente Field Office BLM. This review assisted in correcting any errors or inconsistencies for route inventory or potential designation across jurisdictional boundaries.

Information from these meetings and presentations helped the BLM refine and develop the alternatives presented in this EA. Preliminary route inventory maps have been available for public review since spring 2011 (see http://www.blm.gov/az/st/en/prog/travel_mgmt/strip_tmp.html). The alternative route maps have also been placed on the web at this location so that the public has an opportunity to review potential route designations along with the EA.

This EA and alternative maps are being provided to the public on the web, by mail, and in public meetings so that they have an opportunity to comment and provide additional information. Public meetings to review and comment on this EA will be held in St. George, Colorado City, and Kaibab Village in August, 2013.

5.3 List of Preparers and Reviewers

The following tables list persons who contributed to preparation of this EA.

Table 5.1 List of BLM Preparers/Reviewers

Name	Title	Responsible for the Following Program
Gloria Benson	Tribal Liaison	Resources of Concern to Affected Tribes
Whit Bunting	Team Lead, Range and Vegetation Resources	Vegetation, Special Status Plants, Invasive Non-Native Species
Lorraine Christian	Field Office Manager	Project Oversight
Rody Cox	Geologist	Geology and Mineral Resources
Laurie Ford	Team Lead, Lands & Geological Sciences	Lands & Realty
Diana Hawks	Team Lead, Recreation/Wilderness/Archaeology	Recreation, Wilderness, Visual Resources
John Herron	Archaeologist	Cultural Resources
Jon Jasper	Outdoor Recreation Planner	Recreation, SRPs, Wilderness, Wilderness Characteristics, Visual Resources
Jace Lambeth	Range Specialist	Special Status Plants
Shawn Langston	Wildlife Biologist	Special Status Animals, Special Status Plants, Wildlife
Justin Reeve	Range Technician	Invasive, Non-Native Species
John Sims	Supervisory Law Enforcement	Law Enforcement
Bob Smith	Soil Scientist	Soil, Water, Air
Rachel Tueller	External Affairs Specialist	Communications, public notices
Richard Spotts	Environmental Coordinator	NEPA Compliance

Table 5.2 Non-Federal Agency EA Reviewers

Name	Agency/Organization	Title
Steve Rosenstock	AGFD	Habitat Specialist
Peter Bungart	Hualapai Tribe	Senior Archaeologist
Dawn Hubbs	Hualapai Tribe	Program Manager – Anthropologist/Archaeologist
LeAnn Skrzynski	Kaibab Paiute Tribe	Environmental Program Director

Chapter 6

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APPENDIX

TABLE OF CONTENTS FOR FUTURE TRAVEL MANAGEMENT PLAN

**TRAVEL MANAGEMENT PLAN
FOR LITTLEFIELD, ST. GEORGE BASIN, AND
COLORADO CITY TRAVEL SUB-REGIONS**



U.S. Department of the Interior
Bureau of Land Management
Arizona Strip Field Office

345 E. Riverside Drive
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