BLM

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DRAFT KINGMAN FIELD OFFICE
TRAVEL MANAGEMENT PLAN
ENVIRONMENTAL ASSESSMENT

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Kingman Field Office
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1 Introduction & Background

1.1. Introduction

The Bureau of Land Management (BLM)[1] Kingman Field Office (KFO) Travel Management Plan (TMP) has been prepared considering extensive public and agency input. The intent of the plan is to establish a comprehensive travel network, meeting both current and future access needs to the public lands in this area while minimizing conflict among users of the travel network. These conflicts are described in this document. The plan identifies a system of roads, primitive roads and trails, and the terms for their use and maintenance. Additionally, it outlines the facilities to be developed for recreational use through creation of new routes and closure of other routes to minimize conflicts. The travel network identified in the Kingman TMP is comprised of both motorized and non-motorized trails.

This Environmental Assessment (EA) provides analysis of the Proposed Action and additional alternatives considered during the travel management planning process, in compliance with the National Environmental Policy Act (NEPA) and other Federal and State laws and regulations.

1.2. Background

Federal agencies are directed to manage motorized vehicle use on public lands through Executive Orders (EO) 11644 and 11989, which have been incorporated into the Code of Federal Regulations (CFR) under 43 CFR 8342.1. The Kingman Record of Decision (ROD) and Resource Management Plan (RMP) (BLM 1995a) as well as the Lower Gila North Management Framework Plan (MFP) (BLM 1981) and subsequent Approved Amendment to the Lower Gila North MFP (herein referred to as the "Approved Amendment") (BLM 2005) provide management guidance for the 2,471,000 acres of BLM-administered land located within the KFO project area. The project area for the Kingman TMP is the KFO, which includes nine separate Travel Management Areas (TMAs), and serves as the project area for all resources evaluated in this EA. RMP guidance must be considered in any travel management planning decisions. Surface management within the KFO TMAs includes BLM, National Park Service (NPS), U.S. Army Corp of Engineers, Tribal lands, Bureau of Reclamation, State, county, local, and private. Table 1.2-1 in Appendix B presents the land ownership within the project area.

The TMP EA considers the different modes of travel and access, conditions of travel on public lands, and the need to reduce conflicts with key natural resources, resource values, sensitive habitats, and user groups. This collaborative transportation planning process identifies the type of road construction, if any, and maintenance standards needed to protect resources and accommodate anticipated types of uses and use levels (Tables 1.2-2 and 1.2-3, Appendix B).

The BLM began conducting route inventories within the project area in 2004 utilizing existing maps, available aerial photography, and satellite images. BLM field crews and contractors then utilized four-wheel drive vehicles, motorcycles, horses, mountain bikes, or pedestrian means to travel all identified roads, primitive roads, and trails to collect route inventory data. Once all route inventory data was collected, BLM then conducted a comprehensive route evaluation process that led to the development of four travel network alternatives, with emphasis on various levels of access and resource protection. Four

[1] All acronyms, references and glossary terms are located in Appendix A.

different route types are used to describe the intended use designation: road, primitive road, temporary road, and trail. The alternatives analyzed in this EA include a variety of route designation types which include "open", "limited" and "closed" designations. The route designation type describes the kind of user that can utilize the route, how the use can occur, and when access to the route is allowed. The route designation identifies additional areas where monitoring and mitigation are needed to enhance and/or preserve natural resources. The TMP alternatives consider public input on the management and availability of access routes. These alternatives are described in Chapter 2. For further information on the route inventory and evaluation process, see Appendix C. Additionally, individual route reports are available for review at the Kingman Field Office during normal business hours. For further information on the individual route reports, see Appendix D.

1.3. Purpose and Need

The purpose of the action is to provide the public with a logical and sustainable travel and transportation network that addresses the diverse transportation, access, and recreational needs of the public while protecting sensitive natural and cultural resources on public lands administered by the KFO.

Due to the increase in population and the wide variety and availability of off-highway vehicles (OHVs) there has been an increased demand on public lands that, if unmanaged, could adversely affect resource conditions. Action is needed to determine which routes are appropriate for use, identify the appropriate use level for each route, and designate each route accordingly.

1.4. Decision to Be Made

At the conclusion of the process, the BLM's Authorized Officer (AO) will decide whether to designate the identified routes as "open," "limited," (to only a certain type of user, or a certain type of vehicle, or based on season or time of day) or "closed" to vehicles. Routes designated as "open" or "limited" could be subject to additional management measures (e.g., mitigation, monitoring, etc.).

For subsequent route construction and reclamation projects, additional environmental analysis may be necessary. In some cases, a Determination of NEPA Adequacy (DNA) that tiers to this EA may be adequate where surface disturbance is minimal; however, for new construction projects and route reclamation projects that would involve more than minimal ground disturbance, additional site-specific environmental analysis under NEPA may be required. The decision for the site-specific NEPA analysis would be subject to appeal under 4 CFR 4.21.

1.5. Project Area

The KFO manages over 2.4 million acres of public land in northwestern Arizona (Table 1.2-1, Appendix B). It is located east and southeast of the Colorado River and much of the area is interspersed with other land ownerships (Figure 1.5-1, Appendix E). Important resources in the project area are shown in Appendix C, Section 1.1 of the TMP.

1.6. Land Use Plan Conformance

The BLM currently manages a majority of the TMAs within the project area under the Kingman ROD and RMP (BLM 1995a). The 1995 RMP provides long-term goals specific to the BLM Colorado River

District's (CRD's) resources and uses. The RMP currently limits travel in these areas to six different categories, including (1) existing roads, (2) existing trails, (3) existing washes, (4) designated roads, (5) designated trails, and (6) designated washes. The Travel and Transportation Management Manual (BLM 2016) provides clarification on the RMP-level decisions for allocation of acres designated OHV limited versus the TMP implementation-level decisions. Therefore, the TMP serves to adjust the implementation of the RMP allocations by shifting from an existing route network to a designated route network.

The Kingman ROD and RMP (BLM 1995a) outlines various proposed OHV allocations shown in Appendix B, Table 2.8-1. These allocations, while identified in the Kingman ROD and RMP (BLM 1995a), were not carried forward for detailed analysis. Rationale as to why can be found in Appendix B, Table 2.8-1.

A portion of the Poachies TMA is managed under the Lower Gila North MFP (BLM 1981) and Approved Amendment (BLM 2005). The Approved Amendment (BLM 2005) provides management decisions regarding the designation of OHVs on page 15, specifically RR-9, which limits travel to existing and/or designated roads and vehicle routes. Therefore, the TMP for the Poachies TMA serves to adjust the Approved Amendment allocation by shifting from an existing route network to a designated route network.

1.7. Relationship to Statutes, Regulations, and Other Plans

National and statewide goals, regulations, and polices regarding travel management are established by documents including, but not limited to the following:

- Travel and Transportation Handbook (BLM 2012a);
- Travel and Transportation Manual (BLM 2016a);
- National Management Strategy for Motorized OHV Use on Public Lands (BLM 2001);
- Land Use Planning Handbook (BLM 2005);
- BLM Instruction Memorandum AZ2009-017 State Specific Guidance for Implementation of the Arizona OHV Law;
- BLM Instruction Memorandum AZ2012-067 Clarification of Cultural Resource Considerations for OHV Designations and Travel Management (BLM 2012b);
- Statewide Arizona BLM OHV Regulations and Travel Management Policies (as presented in the BLM State Director's Guidance for Arizona Land Use Planning Efforts Instruction Memorandum AZ-2005-007 and in Section 3.1.1 of the TMP); and
- Executive Orders 11644/11989 – Off-Road Vehicle Management Policies.

1.8. Scoping and Issues

The scoping process provides an opportunity for internal and external input on the Proposed Action's associated issues, possible alternatives, and impacts that should be addressed in a planning process. A detailed summary of the scoping conducted for this project is included in Appendix F, Scoping Report.

1.8.1. Internal Scoping

The BLM interdisciplinary team (IDT) analyzed the potential consequences of the Proposed Action and alternatives during route evaluations and meetings held throughout the development of the TMP. Table 1.8-1 in Appendix B presents the resources considered and the rationale for whether the topic would be carried forward for detailed analysis. Those resources that were determined to be unaffected by the Proposed Action or alternatives are not carried forward in the EA. Resources that could be affected are carried forward for further analysis in this document if they presented issues that necessitate detailed analysis.

1.8.2. External Scoping

The KFO initiated the transportation planning process and began route inventories in 2004. The inventory results were released to the public during scoping meetings, through BLM's ePlanning website, and through an interactive Geographical Information System (GIS) web application viewer in order to identify any route discrepancies. Maps and comment forms were provided for public input and this input was reviewed by the IDT to ensure completeness and accuracy prior to evaluation.

Public scoping meetings were conducted following completion of the inventory review and included distribution of a scoping letter, press release published in three local papers, and updates to the project website to provide notification of the public meetings. Three meetings were held from October 10 through 12, 2017 at three different locations: Wikieup, Kingman, and Bullhead City. The purpose of the public scoping meetings was to:

- Receive input on the issues to be analyzed;
- Receive input on the criteria used for route evaluation;
- Receive input on the importance of routes to the various users;
- Identify routes with particular issues;
- Inform the public on the planning process and RMP guidance;
- Identify the need for new routes;
- Determine if any routes were missed during the inventory process; and
- Identify the need to close routes.

Several computer stations with an interactive GIS web application viewer were available at the public scoping meetings, which allowed participants to not only focus on routes of interest and provide a comment digitally, but be taught the functionality of the application by a GIS professional.

The public scoping meetings were followed by a 60-day comment period. During the 60-day comment period, three additional presentations were made to inform user groups of the scoping period. These presentations took place at the Meadview Community Center and the KFO on November 2, 2017; and the Dolan Springs Chamber of Commerce office on November 8, 2017. Emails were also sent to various user groups. The scoping comments received for the TMP EA identified several distinct issues, which are summarized in Appendix G, Comment Response.

2 Proposed Action and Alternatives

The Proposed Action is one of four alternatives considered in this analysis. Each action alternative meets the purpose and need as described in Chapter 1 (Section 1.3). Additionally, while each action alternative would result in varying route networks and designations, they all follow the prescriptions outlined in the 1995 Kingman ROD and RMP (BLM 1995a) and the Kingman TMP. The Kingman TMP is presented in its entirety in Appendix C.

The Kingman ROD and RMP (BLM 1995a), as well as the Lower Gila North MFP (BLM 1981) and Approved Amendment (BLM 2005), provide management guidance for the approximately 2,471,667 acres of BLM-administered land within the KFO (Table 1.2-1, Appendix B). These land use plans allocated 418,887 acres as closed to vehicle use per the Arizona Desert Wilderness Act of 1990, which designated nine wilderness areas in the KFO. The Wilderness Act of 1964 and subsequent Arizona Desert Wilderness Act of 1990 closed wilderness areas to motorized and mechanical transport (e.g., use of vehicles, bicycles, game carts, etc.). The RMP also designated the majority of public lands in the planning area as "limited to existing roads, trails, and navigable washes."

The route inventory process and route evaluation process are described in Appendix C. Each route requires adherence to 43 CFR 8342.1, which stipulates the criteria for its designation. Compliance of each route with these criteria is documented in the Kingman TMP. This report also provides a statement of rationale or purpose and need for each alternative. Arizona statewide BLM standards for off-highway regulations and travel management policies are listed in the Kingman TMP. The Kingman TMP also lists the desired future conditions of the public lands with implementation of the guidelines prescribed in the plan. The desired future conditions include continuing to provide adequate access for the maintenance and management of wildlife habitat, livestock grazing, minerals, realty, fire, cultural resources, and various recreation activities. Applicable designations and management guidelines outlined in the Kingman ROD and RMP (BLM 1995a), the Lower Gila North MFP (BLM 1981), and Approved Amendment (BLM 2005) are included in the TMP.

2.1. Alternative Development

The action alternatives were developed with careful consideration of administrative actions, goals, and objectives of the route designation process. Guidance and management goals for each TMA within the KFO were applied. The alternatives were also developed and refined throughout the evaluation process with input from BLM staff, management, cooperating agencies, and the public, through the scoping process. Regulation 43 CFR 8342.1 states that all route designations shall be based on the protection of the resources of the public lands, the promotion of the safety of all users of public lands, the minimization of conflicts among various uses of public lands; and in accordance with the criteria outlined in the TMP. During the route evaluation process, each segment was designated as open, limited, or closed based on 43 CFR 8342.1 and the specific evaluation criteria developed by the BLM IDT and subsequent guidance provided in the Kingman ROD and RMP (BLM 1995a), the Lower Gila North MFP (BLM 1981), and Approved Amendment (BLM 2005).

2.2. Comparison of Alternatives

Impacts in this EA are analyzed qualitatively, but quantitative impacts are evaluated when possible. Impact evaluation focuses on direct and indirect effects on specific resources and cumulative impacts, when applicable, and analyzes them against the resource impact indicators in Appendix H. Data for the existing road network were collected by KFO field crews and contractors. Additional GIS resource-specific databases were used for mapping, describing relevant resources, and calculating mileage and acreages. A list of resource data, including type and description used during route evaluations is provided in Appendix I. All action alternatives would result in a net reduction in routes for motorized and mechanized use, as compared to the current conditions.

The "closed" designation category includes those routes that are already naturally reclaiming, as well as routes that may currently be used by the public but are redundant, traverse through sensitive resources, create a public health and safety issue (e.g., excessive erosion, user conflict, etc.), or are not in accordance with criteria outlined in the TMP. The "open" category includes routes that would require additional management actions from BLM such as routine maintenance and improvement. The "limited" categories are defined as follows:

Limited (Administrative and Authorized Users): Routes designated as limited to administrative and/or authorized use. This category of designation includes motorized uses by BLM, permittees, private property owners, and other authorized users on routes with or without additional management actions by BLM.

Limited (Administrative and Seasonal): Routes designated as limited to administrative and/or seasonal use. This category of designation includes emergency administrative use, seasonal motorized use, temporary motorized use, administrative and permittee motorized use, and temporary closures to public use. This category includes routes with and without additional management actions by BLM.

Limited (Non-Motorized): Routes designated as limited to non-motorized use. This category includes hiking, cycling, and equestrian trails for use by the public and routes with and without additional management actions by BLM.

Limited (OHV Width): Routes designated as limited to four-wheel drive (4WD) modified and high clearance vehicles, all-terrain vehicle (ATV) use, and/or motorcycle use by the public. This category includes routes with and without additional management actions by BLM.

Table 2.2-1 in Appendix B provides a comparison of the alternatives. Detailed descriptions of each alternative are presented in Tables 2.3-1, 2.5-1, 2.6-1, and 2.7-1, Appendix B.

2.3. Alternative A (No Action)

Alternative A would maintain existing conditions and management as inventoried and maintain the current balance of use and resource development. Minimal limitations on motorized travel would provide an enhanced motorized recreational experience for some users. Alternative A generally maintains existing management, access, and use patterns and offers minimal restrictions on use type and season. This is the least restrictive alternative. No improvements and only minor limited closures would occur under this alternative. Alternative A provides the baseline for route network comparison and would maintain the

existing route network and designations. Routes previously designated as closed in the Kingman ROD and RMP (BLM 1995a) include only those related to the 1990 Arizona Desert Wilderness Act; these routes would remain closed. This process would involve signage for the closure and passive restoration of the routes. Table 2.3-1 in Appendix B and Figure 2.3-1 in Appendix E present the miles of each route type under Alternative A.

2.4. Elements Common to All Action Alternatives

Each of the action alternatives would include minor route adjustments to avoid sensitive features that were identified during the inventory and evaluation process. This could include a change of no more than 0.25 mile of a designated route. It could also include the opening of a separate existing route that serves the same access need as the route that is to be realigned. Minor realignments of the route network would be considered to be maintenance actions under the TMP, consistent with the BLM NEPA Handbook (BLM 2008).

Maintenance would not include the construction of a new route involving new ground disturbance, except where new construction is necessary to avoid sensitive resources. Minor realignments include the following:

- Minor realignments of a route where necessary to minimize effects on cultural resources;
- Minor realignments of a route necessary to reduce impact on sensitive species or their habitats;
- Minor realignments of a route that would substantially increase the quality of a recreational experience, while not affecting sensitive species or their habitat, or any other sensitive resource value; and
- Opening or limited opening of a route where valid right-of-ways (ROWs) or easements of record were not accurately identified in the route designation process.

Minor realignments must be documented in the official record. The reason for the alignment change would be recorded and kept on file in the KFO.

Routes designated for closure would be decommissioned. This could involve signage, barricades, and passive restoration. Per 43 CFR 8341.2 (a), if it is determined that OHVs are causing or would cause considerable adverse effects to resources along a route, the affected area would be immediately closed to the type(s) of vehicle causing the adverse effects until the effects are eliminated and measures are implemented to prevent recurrence. These closures would not prevent designation of the route in accordance with 43 CFR 8342, but these areas would not be opened to the type(s) of OHV for which it was closed unless the AO determines that the adverse effects have been eliminated and measures have been implemented to prevent recurrence.

Under all action alternatives, routes that were not included in the inventory or documented during the KFO travel management planning process would be considered on a case-by-case basis with written approval from the AO. Travel management designations would not affect valid existing rights for permitted uses, including ROWs, county or State roads, grazing authorizations, or current easements. Routes designated as Authorized and Administrative Use Only are also subject to seasonal closures, vehicle size class restrictions, and ongoing monitoring.

Authorizations for route uses that provide necessary access to authorized or permitted range improvement projects should be incorporated into the travel management network via administrative access during implementation and/or plan maintenance unless detrimental resource concerns need to be analyzed or cannot be mitigated. These projects should be documented in the Rangeland Improvement Project System (RIPS) and/or have a signed Cooperative Agreement, range improvement permit, or other documentation requiring maintenance. These routes, which may provide important access for required maintenance activities, are used occasionally and could have been missed during field inventories.

Any permittee or lessee may apply for a range improvement permit to install, use, maintain, and/or modify removable range improvements that are needed to achieve management objectives for the allotment. If maintenance is no longer possible, access could be necessary for the potential removal and abandonment of these range improvement projects and to reclaim the area. Any new range improvement projects that are installed during the life of the TMP should have administrative access in order to maintain these investments. Any new projects would have site-specific NEPA analysis.

Under each of the action alternatives, the BLM would continue to consider granting ROWs for or including vehicular use. Upon granting of ROWs, including roads or vehicular ways, these would automatically be incorporated into the TMP on a case-by-case basis.

BLM would consult with the State Historic Preservation Office (SHPO) in order to fulfill the process required by Section 106 of the National Historic Preservation Act (NHPA). The exact nature and extent of this consultation would be defined in the programmatic agreement (PA) regarding cultural resources, which is being developed in close consultation with the SHPO and other consulting parties.

The TMP provides specifications for associated KFO maps and signage, including signage for ports of entry. The TMP considers routes that provide access to public lands and areas that provide recreational opportunities (e.g., hunting, fishing, boating, camping) and allow for future funded improvements (e.g., staging areas, non-motorized trails). Any improvements beyond what is discussed in this analysis would require separate site-specific NEPA analysis. Easements may also be pursued with private property owners, as well as in cooperation with the Arizona Game and Fish Department (AZGFD) through their access program. This is aligned with Secretarial Order 3447.

2.5. Alternative B (Resource Protection)

Alternative B would provide the greatest extent of resource protection, while still allowing route uses where conflicts with resource protection do not exist. This alternative would reduce the potential for human impacts to known sensitive resources. Alternative B would provide for increased protection of sensitive wildlife habitat and restoration through route closures. It would also provide maximum protection of known cultural and paleontological sites. Under Alternative B protection of soil and water resources would increase. Alternative B would prohibit the use of routes designated with seasonal closures during the restricted periods. Seasonal use closures include protections for bighorn sheep, in which a route is closed to the public except for two weeks prior to and during the bighorn sheep hunting season (November 15 through December 31). Table 2.5-1 in Appendix B and Figure 2.5-1 in Appendix E present the miles of each route type under Alternative B.

2.6. Alternative C (Proposed Action)

Alternative C is a blended alternative that emphasizes balanced levels of public access and resource protection. Opportunities for public recreation would be improved by providing a more efficient route network and additional user information. This alternative emphasizes multiple-use management by protecting sensitive resources while continuing to provide recreation and travel opportunities. Implementation of Alternative C would emphasize adaptive management where reasonable and practicable, based on available funding and personnel. Alternative C includes minor new connector routes between existing routes to provide access to public lands that are currently inaccessible. Seasonal closures under Alternative C would prohibit use of routes designated with seasonal closures related to big horn sheep within the KFO. Alternative C would reduce route redundancy and habitat fragmentation and offer additional protection of sensitive resources. A total of approximately 1,631 route miles would be closed. Table 2.6-1 in Appendix B and Figure 2.6-1 in Appendix E present the miles of each route type under Alternative C.

2.7. Alternative D (Access)

Alternative D would allow the greatest extent of route use and access, while maintaining the basic protections needed to sustain sensitive resources (Figure 2.7-1, Appendix E). Alternative D maximizes the use of the existing transportation system and provides minimal restrictions on type and season of route use. This alternative maximizes public access and motorized opportunities for all visitors, with some restrictions. Among the action alternatives, the least number of route closures (832 miles) would occur under Alternative D. Seasonal closures under Alternative D would prohibit use of routes designated with seasonal closures related to bighorn sheep within the KFO. Table 2.7-1 in Appendix B and Figure 2.7-1 in Appendix E present the miles of each route type under Alternative D.

2.8. Alternatives Considered but Eliminated from Further Analysis

Numerous route designation strategies were considered as possible alternatives for the establishment of a route network within the project area. The three action alternatives (B, C, and D) were developed through this process, but other alternatives were also considered and eliminated from further analysis. Table 2.8-1 in Appendix B presents these alternatives and the reasons for their elimination.

3 Affected Environment

3.1. Air Quality

The BLM Air Resource Management Program Strategy for 2015 – 2020 strives to reduce and mitigate pollutant emissions through its objective to limit pollutant emissions to the atmosphere (BLM 2015a). In addition, the BLM Air Quality Manual (BLM 2009) and BLM Guidance for Conducting Air Quality General Conformance Determinations (BLM 2012) are guiding documents for air quality assessment and compliance for the KFO. Primary combustion by-products potentially affecting air quality in OHV-use areas include (but are not limited to) polycyclic aromatic hydrocarbons (PAHs), sulfur dioxide (SO_2), nitrogen oxides (NOx), and ozone (O_3) (Ouren 2007).

Under the Clean Air Act (CAA), the Environmental Protection Agency (EPA) sets and reviews National Ambient Air Quality Standards (NAAQS) for criteria pollutants including SO_2, NOx, O_3, and particulate

matter (PM). The Arizona Department of Environmental Quality (ADEQ) Air Quality Division enforces compliance with the NAAQS for criteria air pollutants emitted by sources within the agency's jurisdiction, which includes Mohave County. In addition, ADEQ maintains air quality monitoring data for the State and maintains the Air Quality Index, which is in indication of air quality in the State.

Dust is PM that consists of very small particles. Fugitive dust is PM suspended in the air primarily from soil that has been disturbed by wind or other activities (ADEQ 2017). Air quality is affected when OHV travel raises fugitive dust and emits by-products of combustion. Wind can disperse suspended particulates over long distances; therefore, dust raised by OHV travel can blanket plant foliage and disperse dust-adsorbed contaminants beyond a given OHV-use area. Fugitive dust raised by OHV traffic on unpaved roads and trails can contribute to air quality degradation. Wind erodible soils are described in detail in Section 3.2.2, Soil Resources. Table 3.2-1 in Appendix B provides detail on the wind erodibility of soils along routes within the project area.

A State Implementation Plan (SIP) is a collection of regulations and documents used by a state, territory, or local air district to reduce air pollution in areas that do not meet NAAQS (ADEQ 2018). The EPA assigns classifications to geographic areas based upon monitored air quality conditions. The categories are:

- Attainment,
- Nonattainment, and
- Unclassified.

A small portion of the KFO falls within a portion of an area that has been designated by EPA as "PM_{10} Attainment with a Maintenance Plan" for the 24-hour PM_{10} NAAQS. The maintenance area occurs in the western portion of the KFO, north and south of Arizona State Route 68 and Bullhead City, as shown in Figure 3.1-1 in Appendix E. For this area, a SIP was established to outline a plan for achieving compliance with the PM_{10} NAAQS; the plan was executed successfully, ADEQ demonstrated to EPA that the area had achieved compliance, and EPA redesignated the area as an attainment area. The 2012 Limited Maintenance Plan Update for the Bullhead City PM_{10} Maintenance Area updated the 2002 Bullhead City Moderate Area PM_{10} Maintenance Plan and Request for Redesignation to Attainment, providing for the maintenance of the national primary ambient air quality standard for the years 2012 through 2020. Limited Maintenance Plans contain requirements for the State to document continued maintenance of the NAAQS once an area has been redesignated to attainment. The final plan was submitted in May 2012. All other areas within Mohave County are currently classified as attainment or are unclassified.

Class I Federal lands include areas such as national parks, national wilderness areas, and national monuments. These areas are granted special air quality protections under Section 162(a) of the CAA. Class I areas allow for very little deterioration of air quality. Class II areas allow moderate deterioration (CAA Section 162). Under the NAAQS, most BLM administered lands within the KFO are rated Class II. The KFO does not manage any Class I areas, however Grand Canyon National Park (GCNP) is a Class I area and is located adjacent to the KFO to the northeast. Lake Mead National Recreational Area (NRA), located directly northwest of the KFO, is designated Class II.

3.2. Soil Resources

The Kingman project area is located within the Western Range and Irrigated Region. Soil resources within the project area have formed within five Major Land Resource Areas (MLRAs) (NRCS 2006):

- MLRA 30 - Mojave Desert;
- MLRA 31 - Lower Colorado Desert;
- MLRA 35 - Colorado Plateau;
- MLRA 38 - Mogollon Transition; and
- MLRA 40 - Sonoran Basin and Range.

Refer to Appendix J for descriptions of the MLRAs located within the project area.

3.2.1. Soil Characteristics

Fragile soil areas are highly or severely erodible by wind or water and therefore are more susceptible to accelerated erosion and degradation requiring specific management consideration. Fragile soils are generally characterized by a low content of organic matter, low aggregate stability, and weak soil structure. They are generally located on sloping ground, have sparse plant cover, and tend to be in arid or semiarid regions. The Fragile Soil Index can be used for conservation and watershed planning to assist in identifying soils and areas highly vulnerable to degradation (NRCS 2017).

Road suitability indicates the suitability of the natural surface of the soil for roads. The ratings are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified Soil Classification System, depth to a water table, ponding, flooding, and the hazard of soil slippage. Figure 3.2-1 in Appendix E shows the suitability for roads within the project area.

Water erosion is the detachment and movement of soil by water. Natural erosion rates depend on inherent soil properties, slope, soil cover, and climate. The water erosion hazard from unsurfaced roads and trails are based on soil factors such as slope, rock fragment content, and the K factor (soil erosion factor).

Wind erosion is the physical wearing of the earth's surface by wind. Wind erosion removes and redistributes soil. Small blowout areas may be associated with adjacent areas of deposition at the base of plants or behind obstacles, such as rocks, shrubs, fence rows, and roadbanks. Wind erodible soils were characterized as having a wind erodibility group value of 1 through 3.

Table 3.2-1 in Appendix B provides detail on the soil suitability and hazards along routes within the project area.

3.3. Surface Water and Water Quality

3.3.1. Surface Water

The project area lies within the Lower Colorado River basin and includes portions of the Bill Williams River basin, Detrital Wash, Truxton/Hualapai Wash, and Sacramento Wash (BLM 1993). The primary perennial waterbody is the Colorado River, which flows along the north and west boundary of the project area. Other perennial waterbodies include Big Sandy River, Trout Creek, and Burro Creek (Figure 3.3-1, Appendix E). Big Sandy River is a tributary of the Bill Williams River. Trout Creek and Burro Creek are

major tributaries to Big Sandy River. Freshwater emergent wetlands are also present within the project area (wetlands are further described in Section 3.4.2). Several intermittent and ephemeral streams are also present in the project area. Intermittent streams generally have flowing water during the wet season (winter-spring) but are normally dry during hot summer months. Ephemeral streams only flow in response to large precipitation events. A flash flood is a rapid flooding of geomorphic low-lying areas: washes, rivers, dry lakes and basins. Flash floods are common in ephemeral and intermittent streams in the arid west and may be caused by heavy rain associated with a severe thunderstorm.

3.3.2. Floodplains

EO 11988 requires Federal agencies to avoid to the extent possible, both the long and short term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Approximately 600 miles of routes occur within the 100 year floodplain of waterbodies in the KFO.

3.3.3. Water Quality

BLM's policy states that agency projects should meet or exceed water quality standards established by the State of Arizona for all water bodies located on or influenced by BLM-administered lands. The State of Arizona maintains a 303(d) list of impaired waterbodies along with summaries of use attainment for streams and rivers within the State of Arizona. A query of this data indicated that four 303(d)-listed reaches or waterbodies occur within the project area.

- Colorado River, From Hoover Dam To Lake Mohave
- Boulder Creek, From Tributary At 34°41'14" / -113°03'34" To Wilder Creek
- Bill Williams River, From Alamo Lake To Castaneda Wash
- Lake Mohave

3.4. Vegetation Resources

3.4.1. Upland Vegetation

The project area is located within four level III ecoregions, including Mojave Basin and Range, Sonoran Basin and Range, Arizona/New Mexico Plateau, and Arizona/New Mexico Mountains (Table 3.4-1 in Appendix B). Ecoregions are areas where ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. Creosote bush is common within the Mojave Basin and Range ecoregion while the Sonoran Basin and Range ecoregion contains large areas of paloverde-cactus shrub and saguaro cactus. The Arizona/New Mexico Plateau ecoregion is a transitional zone between the drier shrublands and wooded tablelands up higher on the Colorado Plateau to the north, the hotter sparsely vegetated Mojave Basin and Range to the west, the semiarid grasslands to the east, and the forested mountains to the northeast and south. The Arizona/New Mexico Mountains ecoregion is characterized by drier, warmer environments and includes chaparral at lower elevations, pinyon-juniper and oak woodlands at lower and middle elevations, and ponderosa pine forests at higher elevations (EPA 2017).

General vegetation zones within the project area can be classified by ecological systems and further categorized into land cover types according to mapping done by the Southwest Regional Gap Analysis Project (SWReGAP). Within the project area, ecological systems include grassland/herbaceous, scrub,

evergreen forest, woody wetland, emergent wetland, barren lands, altered or disturbed land cover types, developed and agriculture cover types, and other types (USGS National Gap Analysis Program 2004; Table 3.4-2 in Appendix B, Figure 3.4-1 in Appendix E). A majority of the project area (73 percent) is covered by scrub vegetation with evergreen forests covering another 20 percent of the project area. Further information regarding the biological setting of upland vegetation can be found in Appendix K.

3.4.2. Wetland and Riparian Vegetation

There are 55,161 acres of woody wetland (i.e., riparian) and emergent herbaceous wetland vegetation within the project area (Table 3.4-2 in Appendix B; Figure 3.4-1 in Appendix E). Wetland and riparian areas provide important habitat for threatened, endangered, and sensitive species (these species are discussed in further detail in section 3.7 Special Status Species), and migratory birds (see further detail in section 3.6 Wildlife Resources). Riparian woodlands and shrublands provide habitat for a variety of species, such as southwestern willow flycatcher and western yellow-billed cuckoo, and provide important ecological function to stream and river systems. Healthy riparian systems filter and purify water as it moves through the riparian area, reduce sediment loads and enhance stream bank stability, provide microclimate moderation when contrasted to extremes in adjacent areas, and contribute to groundwater recharge and base flow (BLM 1993). Further information regarding the biological setting of wetland and riparian vegetation can be found in Appendix K.

3.5. Noxious Weeds and Invasive Species

Noxious weeds are regulated and restricted by Arizona Administrative Code (R3-4-244 and R3-4-245). Arizona Department of Agriculture (AZDA) maintains a list of regulated and restricted pest species (AZDA 2017).

One of the BLM's highest priorities is to promote ecosystem health and one of the greatest obstacles to achieving this goal is the rapid expansion of invasive, non-native species across public lands. These plants can dominate and often cause permanent damage to natural plant communities. If not eradicated or controlled, invasive, non-native species would continue to jeopardize the health of the public lands and constrain the myriad of activities that occur on public lands (BLM 2017a). Table 3.5-1 in Appendix B lists invasive and non-native species according to abundance categories. Further information regarding the biological setting of noxious weeds and invasive species can be found in Appendix K.

3.6. Wildlife Resources

3.6.1. Terrestrial Wildlife

Various terrestrial wildlife species can be found throughout the project area, including small mammals such as desert pocket mouse (*Perognathus penicillatus*), Merriam's kangaroo rat (*Dipodomys merriami*), and round-tailed ground squirrel (*Xerospermophilus tereticaudus*). Large mammals and predators such as coyote (*Canis latrans*) and mountain lion (*Puma concolor*) are also present (Hoffmeister 1986). Big game species such as desert bighorn sheep (*Ovis canadensis nelsoni*), mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), and pronghorn (*Antilocapra americana*) are found in the project area (BLM 1995a). Birds such as peregrine falcon (*Falco peregrinus*), great horned owl (*Bubo virginianus*), ladder-backed woodpecker (*Picoides scalaris*), Gambel's quail (*Callipepla gambellii*), and black-tailed gnatcatcher

(*Polloptila melanura*) occur in the project area (Corman and Wise-Gervais 2005). Reptiles such as coachwhip (*Masticophis flagellum*), Mohave rattlesnake (*Crotalus scutulatus*), desert horned lizard (*Phrynosoma platyrhinos*), desert spiny lizard (*Sceloporus magister*), and Great Basin collared lizard (*Crotaphytus bicinctores*) are present in the project area (Brennan and Holycross 2006). Some species are year-long residents, while others are migrants and only found in the project area at certain times of the year.

Important big game species present in the project area are identified in Table 3.6-1 in Appendix B, along with their general distribution in the State and a brief description of where suitable habitat is located on BLM land (BLM 1995a). A map of desert bighorn sheep habitat present in the project area is illustrated in Figure 3.6-1, Appendix E. Additional detailed information on the various big game species present in the KFO is included in the Kingman Field Office Proposed Resource Management Plan (PRMP) Environmental Impact Statement (EIS) (BLM 1993). Further information regarding the biological setting of terrestrial wildlife can be found in Appendix K.

3.6.2. Aquatic Wildlife

Aquatic wildlife species and their habitats are typically limited to perennial streams and some intermittent streams. Within the project area, aquatic species would likely be found within the Big Sandy, Santa Maria, and Bill Williams Rivers; Francis, Boulder, Burro, Wright, and Sycamore Creeks; Blue Tank Wash; and Alamo Lake (BLM 1995a). Aquatic wildlife includes ducks, geese, and wading birds, such as the mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanoptera*), pied-billed grebe (*Podilymbus podiceps*), American coot (*Fulica americana*), Canada goose (*Branta canadensis*), killdeer (*Charadrius vociferus*), and spotted sandpiper (*Actitis macularia*) (Corman and Wise-Gervais 2005). Amphibians found in the project area include tiger salamander (*Ambystoma tigrinum*), red-spotted toad (*Bufo punctatus*), Great Plains toad (*Bufo cognatus*), lowland leopard frog (*Lithobates yavapaiensis*), and canyon treefrog (*Hyla arenicolor*) (Brennan and Holycross 2006). Native fish that occur within the project area include desert sucker (*Catostomus clarki*), Sonora sucker (*Catostomus insignis*), longfin dace (*Agosia chrysogaster*), speckled dace (*Rhinichthys osculus*), and roundtail chub (*Gila robusta*) (Minckley 1973). Federally listed and BLM sensitive species are addressed in Section 3.7, Special Status Species. Further information regarding the biological setting of aquatic wildlife can be found in Appendix K.

3.6.3. Migratory Birds

The majority of bird species in Arizona are protected by the Migratory Bird Treaty Act (MBTA). The Bald and Golden Eagle Protection Act of 1940 (BGEPA) and the Endangered Species Act of 1973 (ESA) offer additional protections to certain migratory bird species.

Migratory birds utilize varied habitats throughout Arizona as they travel between winter and summer ranges and many species both breed and nest within the State's boundaries. Suitable foraging habitat and, to a lesser extent, nesting habitat occurs in most of the project area. The U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Conservation System (IPaC) decision support system was queried to obtain a list of migratory birds likely to occur within the project area (USFWS 2017a). Birds associated with the project area are generally widely distributed and common throughout the area and on adjacent public and private lands. Some species are year-round residents, such as bald eagle (*Haliaeetus*

leucocephalus), Gila woodpecker (*Melanerpes uropygialis*), pinyon jay (*Gymnorhinus cyanocephalus*), and black-chinned sparrow (*Spizella atrogularis*), while other species are only found in the project area only during the breeding season, such as Mexican whip-poor-will (*Antrostomus arizonae*). A few species are only found in the project area during the winter, including grasshopper sparrow (*Ammodramus savannarum ammolegus*) and lark bunting (*Calamospiza melanocorys*) (USFWS 2017a). Further information regarding the biological setting of migratory birds can be found in Appendix K.

3.7. Special Status Species

3.7.1. Federally Listed Species

The USFWS IPaC decision support system was queried to obtain a list of threatened, endangered, and candidate species with potential to occur within the vicinity of the project area. The species list was reviewed with BLM staff (Rebecca Peck, pers. comm. 2017), to determine which species could be affected by the project. Five federally listed species were identified and are discussed in Table 3.7-1, Appendix B. Additional species listed in the IPaC report include black-footed ferret (*Mustela nigripes*) and California condor (*Gymnogyps californianus*), both of which are designated as experimental, non-essential populations within the project area and are not expected to be impacted. The California least tern (*Sterna antillarum browni*) may occur in the project area as a transient during migration but is not known to breed in Arizona outside Maricopa County, which is over 10 miles away at the nearest point, though suitable breeding habitat is farther away. The desert tortoise (*Gopherus agassizii*) was included on the IPaC list; however, the project area is located south and east of the Colorado River, which is outside the range of this species. Yuma Ridgways (clapper) rail (*Rallus obsoletus [longirostris] yumanensis*), bonytail chub (*Gila elegans*) with critical habitat, humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*) with critical habitat are found in or along the Colorado River at the very edge of the project area where there would be no impacts. Headwater chub (*Gila nigra*) and roundtail chub (*Gila robusta*) were both included in the IPaC list; however, the proposal to list both species was withdrawn in April 2017. Regardless, no impacts to either species are expected.

The southwestern willow flycatcher (*Empidonax traillii extimus*) is most often found in dense riparian vegetation near a permanent or semi-permanent source of water below 8,500 feet above mean sea level (amsl) in elevation. This species is threatened by loss and degradation (i.e., water development, fire, and human disturbance) of dense riparian habitats (USFWS 1995). Potential habitat is present within the project area along the Big Sandy River and the Santa Maria River at its confluence with the Big Sandy River (Figure 3.7-1 in Appendix E; Rebecca Peck, pers. comm. 2017).

The yellow-billed cuckoo (*Coccyzus americanus*) is found in wooded habitat with dense cover and water nearby. This species is threatened by loss and degradation (i.e., water development, agriculture, housing, and human disturbance) of riparian habitats (USFWS 2014). There is potential habitat within the project area along the Big Sandy River, Santa Maria River, and Burro Creek. While exact nesting locations are not known, individuals have been observed along all three waterways (Figure 3.7-2, Appendix E; Rebecca Peck, pers. comm. 2017).

The Mexican spotted owl (*Strix occidentalis lucida*) requires complex structural components of old-growth or mature forest but have also been known to utilize rocky cliffs near riparian vegetation. Mexican spotted owls are threatened by habitat removal (i.e., logging, wildfires, and road construction) and

recreational activities (i.e., shooting, OHVs, and hiking) that disrupt nesting, roosting, or foraging sites (USFWS 1993). There is suitable habitat within the project area in the Hualapai Mountains that has been occupied historically; however, there is currently no known occupied habitat (Figure 3.7-3, Appendix E; Rebecca Peck, pers. comm. 2017).

The northern Mexican gartersnake (*Thamnophis eques megalops*) is considered a riparian obligate; it is found in wooded habitat with dense cover and water nearby. This species is threatened by loss and degradation of riparian habitats (i.e., water development, agriculture, and housing) and the presence of harmful nonnative species (USFWS 2013). There is potential habitat within the project area along the Big Sandy River, Santa Maria River, and Burro Creek. While exact inhabited areas are not known, individuals have been observed along all three waterways (Figure 3.7-4, Appendix E; Rebecca Peck, pers. comm. 2017).

The Arizona cliffrose *(Purshia subintegra)* is a member of the rose family (*Rosacea*). It is endemic to calcareous soils. This species is threatened by site-specific mining activity of pharmaceutical quality clay, grazing, existing rights-of-way and recreational activities such as rock hounding and OHV use in the immediate area (USFWS 1984). This endangered species has four known populations. It is found in two locations within the project area: one is near Burro Creek at Six-Mile Crossing and the other is within the Clay Hills Area of Critical Environmental Concern (ACEC) (Figure 3.7-5, Appendix E).

Further information regarding the biological setting of federally listed species can be found in Appendix K.

3.7.2. BLM Sensitive Species

Table 3.7-2 in Appendix B provides a list of BLM sensitive species for the Kingman Field Office (BLM 2017b). These species have the potential to occur in a variety of habitats within the project area. A description of suitable habitat for each species is included in the table.

The Sonoran Desert tortoise (*Gopherus morafkai*) and the Hualapai Mexican vole (*Microtus mexicanus hualpaiensis*) are both sensitive species found within the project area for which BLM gives extra consideration. Sonoran Desert Tortoises are primarily found on rocky hillsides and bajadas of Mojave and Sonoran desert scrub, but may encroach on grass land and juniper woodland, as well as interior chaparral habitats. Figure 3.7-6 in Appendix E is a map of Sonoran Desert Tortoise habitat within the project area. There is a total of 2,025,444 acres identified as tortoise habitat within the project area.

The Hualapai Mexican vole was listed as endangered under the ESA on November 2, 1987, and USFWS delisted the species on June 23, 2017, stating the original classification data were in error. This species is often found in moist, grass/sedge habitats along permanent or semi-permanent waters. Figure 3.7-7 in Appendix E is a map of Hualapai Mexican vole habitat within the project area. There is a total of 6,353 acres identified as Hualapai Mexican vole habitat, approximately one-third of which is a habitat protection buffer, within the project area.

Further information regarding the biological setting of BLM sensitive species can be found in Appendix K.

3.8. Livestock Grazing

A total of 85 grazing allotments are currently authorized within the project area. A total of 129,399 Animal Unit Months (AUMs) of active grazing use are allocated to these allotments. Approximately 2,471,000 acres of public lands within the project area are permitted for grazing. Most of the livestock being grazed are cattle, but 11 allotments are authorized for horses. (BLM 2017d). Most operators graze the allotments year-round but some only graze seasonally. Many allotments contain private and State Trust lands interspersed with public lands (BLM 1993). The BLM administers the grazing use only on BLM-managed lands. Figure 3.8-1 in Appendix E displays the grazing allotments in the project area. Table 3.8-1 in Appendix B presents allotment information for the project area.

Allotment Management Plans have been developed and implemented for 42 allotments and two additional plans are proposed (Table 3.8-1, Appendix B). The types of range improvements implemented to improve grazing effectiveness include fencing and water sources. Ranchers utilize a variety of roads and trails to access their allotments to manage stock and maintain range improvements.

3.9. Lands with Wilderness Characteristics (Inventoried)

Section 201 of the Federal Land Policy and Management Act (FLPMA) requires BLM to maintain on a continuing basis an inventory of all public lands and their resources, including wilderness characteristics. The KFO began the process of identifying and inventorying potential lands with wilderness characteristics within its administrative boundaries in 2017 by evaluating "Roadless" (i.e., not containing highway, county, or mechanically maintained BLM roads) areas greater than 5,000 acres. The inventory, as of July 2018, has resulted in the identification of 28 units totaling 539,289 acres or 22.5 percent of the project area's land surface. Initial inventory data shows that of the 28 identified units, 20 units totaling 484,247 acres have been identified as possessing wilderness characteristics. Table 3.9-1 in Appendix B provides the number of route miles within each wilderness characteristics inventory unit and if the unit has the presence of wilderness characteristics. Figure 3.9-1 in Appendix E illustrates the lands with the presence for wilderness characteristics within the project area.

In addition to the ongoing identification and inventory of potential lands with wilderness characteristics BLM is undertaking, the KFO has received a recently-submitted citizen inventory conducted under the guidance contained in BLM Manual 6310 (BLM 2012). The citizen inventory identified 31 units totaling 485,992 acres or 20.2 percent of the project area's land surface. The KFO is currently in the process of evaluating these units and documenting any critical differences between BLM inventory findings and citizen inventory findings in accordance with the guidance contained in the BLM 6310 Manual (BLM 2012).

Guidance contained in BLM Manual 1626 (BLM 2016) directs the BLM to not designate primitive roads and motorized/mechanized trails within lands managed for wilderness characteristics. Therefore, routes in these areas would not typically be designated through BLM's travel management planning process. However, the Kingman ROD and RMP (BLM 1995a) and the Lower Gila North MFP (BLM 1981) and Approved Amendment (BLM 2005) do not allocate any lands managed for wilderness characteristics and do not provide guidance on the management or subsequent goals and objectives for any lands with wilderness characteristics within the KFO. Therefore, routes identified in the KFO within lands inventoried for the presence of wilderness characteristics would be designated through the proposed TMP

and those designations would be incorporated into the transportation system until such time the BLM designates lands managed for wilderness characteristics under an RMP decision.

3.10. Areas of Critical Environmental Concern

Section 202 of FLPMA mandates giving priority to the designation and protection of ACECs. ACECs are areas where special management attention is needed to protect and prevent damage to important historical, cultural, and scenic values; fish, or wildlife resources; or other natural systems or processes (BLM 2017e). A total of 12 ACECs are designated within the project area (Figure 3.10-1, Appendix E). These ACECs and the miles of existing BLM routes along with brief descriptions of each are provided in Appendix L.

3.11. National Natural Landmark

The National Natural Landmarks (NNL) Program is managed by the NPS and conserves sites that contain outstanding biological and geological resources. One of these sites, the Grapevine Mesa Joshua Trees Forest Natural Landmark, is located within the Joshua Tree Forest – Grand Wash Cliffs ACEC within the project area.

The Grapevine Mesa Joshua Trees Forest NNL was designated in 1967 after a determination was made by NPS that the area possessed national significance as defined in 36 CFR 62.5, National Landmark Criteria (NPS 2017). Approximately 3,200 acres are included in this NNL (BLM 1993). It is located near the west end of the Grand Canyon just east of the Lake Mead National Recreation Area (LMNRA). The Grapevine Mesa Joshua Tree Forest contains the densest stand of vigorous multi-aged Joshua trees in Arizona (Kliemann 1979). A total of 14.88 miles of BLM motorized routes currently exist within the Grapevine Mesa Joshua Trees Forest Natural Landmark. Primary uses within the NNL include OHV driving/touring, hiking, bird watching, photography, and interpretive site viewing. Recreational activities within the NNL are characterized by low-intensity, transitory, and short-term (less than 30 minutes) use typically associated with recreationists accessing adjacent points of interests such as Grand Canyon West or the LMNRA. Table 3.11-1 in Appendix B describes the NNL within the project area.

3.12. Cultural Resources

Relevant laws, ordinances, EOs, policies, regulations and agreements other than NEPA include the Antiquities Act of 1906 (16 U.S.C. 431–433); NHPA of 1966, as amended (54 U.S.C. § 306101 et seq.); EO 11593 Protection and Enhancement of the Cultural Environment (May 13, 1971); American Indian Religious Freedom Act of 1978 (92 Stat. 469: 42 U.S.C. 1996); Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa–470mm); Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001–3013); EO 13007 Indian Sacred Sites (May 24, 1996); and FLPMA of 1976 (90 Stat. 2743; 43 U.S.C. 1701).

Archaeologists have documented a long history of human occupation in what is now western Arizona. The cultural history of the region is divided into numerous periods that reflect changing adaptations and lifeways. Approximately 134,411 acres of the cultural resources study area, defined as a 1/8-mile buffer along the routes, has been previously surveyed. A total of 1,116.58 miles of routes intersect previously

surveyed areas. There are 712 previously recorded sites present in the study area, of which 367 are eligible or treated as eligible for listing in the National Register of Historic Places (NRHP).

BLM will consult with the Arizona SHPO in order to fulfill the process required by Section 106 of the NHPA. The exact nature and extent of this consultation will be defined in the PA regarding cultural resource compliance, which is being developed in close consultation with the SHPO, Advisory Council on Historic Preservation (ACHP), and other consulting parties. A Class I cultural resources inventory was initiated in October 2017 to identify cultural resources located along routes in the project area. The Class I inventory also includes the development of a predictive model for identifying routes that traverse areas of low-, medium-, and high-sensitivity in terms of potential impacts to cultural resources. The predictive model would also be used to facilitate the identification of cultural resource survey needs in regard to the TMP.

The cultural history of the project area is summarized below to provide a context for understanding the cultural resources present within areas that could be affected by implementation of the TMP.

The project area falls within the Colorado Plateau, Transition Zone, and Basin and Range physiographic provinces (Stone 1987). The landscape in the northeastern portion of the project area occurs within a transition zone between the Basin and Range and Colorado Plateau provinces. In this western region of Arizona, there is little evidence of Paleoindian-Period (ca.11,000–6,000 B.C.) occupation, the time when the earliest humans in North America traveled in small, mobile groups to hunt now-extinct megafauna species. The earliest evidence of human occupation in western Arizona consists of projectile point artifacts of the Lake Mohave complex found near the Colorado River and along desert washes south of the Kingman region, which date to between 9,000–8,000 B.C. and approximately 5,500 B.C. (Basgall 2000; Stone 1987:52). Population increased during the subsequent Archaic Period (6,000 B.C.-A.D. 1) when, as a result of changes to regional environmental conditions, hunter-gatherer groups diversified their subsistence practices. Sites characteristic of this period are well represented in the project area, and often include lithic scatters and grinding stones.

The period between A.D. 1 and A.D. 700 can be considered a lengthy transition as populations generally shifted away from highly mobile hunting and gathering. The Formative Period, which is marked by the advent of pottery manufacturing and an increasing reliance on agriculture, began in western Arizona around A.D. 700 (Dobyns 1956; Dobyns and Euler 1956; Euler 1958; Euler and Dobyns 1956). After A.D. 700 the Patayan archaeological culture was well established across northwestern Arizona, for which two adaptive traditions are recognized, the lowland Patayan, and the upland Patayan. There is considerable evidence for cultural continuity between the lowland Patayan and the Aha Macav, as well as between the upland Patayan and historic period Pai groups including both the Hualapai and Yavapai (Schwartz 1989; Stone 1987:58).

Early European contact was first made in 1604 by Juan de Onate, and then again in 1776 by Francisco Garcés (Simmons 1991; Dobyns and Euler 1956). These early explorations were followed by several U.S. Army expeditions in the 1850s to survey for possible railroad and wagon routes. In 1863, gold and silver was discovered in the Black, Cerbat, and Hualapai Mountains, and by the early 1870s, mining towns sprang up in the region, including Mineral Park, Cerbat, Chloride, Signal, Cedar, and Oatman. In 1871, Cerbat was made the county seat for Mohave County; however, two years later, the county seat was moved to Mineral Park (Barnes 1988).

In 1882, railroad construction began in Mohave County, and several railroad stops were established. Kingman was established as a railroad stop in 1883 (Trimble 1987). Because of the railroad, Kingman became the most important city in Mohave County and was selected as the county seat in 1887 (Trimble 1987). During the early twentieth century, the local economy was largely based on local mining operations, and tourism and travel have been responsible for its ever-expanding growth since the 1920s. In 1936, U.S. Route 66 (also known as the "mother road") was completed, connecting Chicago with Santa Monica. The highway traversed the State of Arizona, running through Kingman and the gold mining town of Oatman in the Black Mountains while winding its way to California (Photograph 3.12-1, Appendix M). Route 66 was the first main thoroughfare between the Midwest and California, and played an important role in early 20th century American history by funneling people away from the drought-ravaged areas of Texas and Oklahoma during the Dust Bowl. It later served as a vital supply route during World War II, transporting troops and supplies to the Pacific theater (Wallis 1991).

3.13. Native American Concerns

The BLM KFO consulted with nine Native American tribes, offering each tribe the opportunity to participate in the NEPA process as a cooperating agency. These tribes include the: Chemehuevi Indian Tribe, Colorado River Indian Tribes, Fort Mcdowell Yavapai Nation, Fort Mojave Indian Tribe, Hopi Tribe, Hualapai Tribe, Navajo Nation, Yavapai-Prescott Indian Tribe, Yavapai-Apache Nation, and Salt River Pima-Maricopa Indian Community. The Yavapai-Apache Nation responded and accepted cooperating agency status. The Hopi Tribe specifically deferred cooperating agency status, but indicated an interest in continued communication about the project and an opportunity to review the drafts of various documents produced for the project. The Hopi also indicated that they generally support the most restrictive alternatives in public lands travel management plans. For the purposes of NHPA Section 106 compliance, Tribal consultation for the project began when certified letters were mailed on August 21, 2017, to all federally recognized Native American Tribes either residing in or with cultural ties to the project area.

The project area includes the traditional homelands of several Native American Tribes, and is known to contain areas and locations of religious and cultural significance to Native Americans. Historic and prehistoric archaeological sites that represent the ancestral activities of descendent Tribes are regarded culturally important. Locations often cited as having special significance include rock art sites, springs, habitation sites, and cemeteries.

3.14. Paleontological Resources

Federal laws applicable to paleontological resources on BLM lands include the Paleontological Resources Preservation Act (PRPA) of 2009 (16 U.S.C. 470aaa – aaa-11), NEPA of 1969, and FLPMA (Pub.L. 94–579) of 1976. The PRPA requires all Federal agencies to develop plans and procedures for the inventory and monitoring of paleontological resources on and from Federal land in accordance with applicable laws and regulations.

The southern portion of the project area in southwest Yavapai County contains one of the best-known Miocene-aged vertebrae faunas in North America. It contains rhinoceros and the camelid fossils from the Arikareen or Hemingfordian North American Land Mammal Ages (NALMA) (Morgan and White 2005; Janis et al. 1998).

There is one known geologic formations that have yielded notable paleontological deposits within the project area. The Big Sandy Formation is a conglomerate of Tertiary outcrops along the Sandy River in Mohave County near the town of Wikieup (Sheppard and Gude 1972). The Big Sandy Formation spans an area of approximately 30 square miles, and certain localities within the formation have proven rich in vertebrate fauna fossils dating to the latest Miocene Epoch (i.e., Hemphillian NALMA) (Dickinson 2008). The Big Sandy Formation contains one of the largest varieties of Late Miocene avian faunas in North America, as well as a rich diversity of mammalian quadrupeds (Dickenson 2008).

Within the project area, as defined by the Potential Fossil Yield Classification (PFYC) system, the potential for paleontological resources is documented through the use of Class 1, 2, 3, 4, 5, U, and W. These classes, their descriptions and acreage can be found in Table 3.14-1 in Appendix B as they relate to the project area.

3.15. Access and Transportation

The existing route system within the KFO offers a range of experiences for both motorized and non-motorized users and provides access for a multitude of purposes. The project area is comprised of nine TMAs, located in the northwest region of Arizona. The project area is divided by one major interstate (I-40), one major U.S. highway (U.S. Highway 93) and four major State highways (Historic Route 66, SR-68, SR-96, and SR-97). These major transportation corridors serve as gateways to six paved county roads (Stockton Hill Road, Pierce Ferry Road, Hualapai Mountain Road, DW Ranch Road, White Hills Road, and Temple Bar Road), one paved BIA highway (Diamond Bar Road), several county-maintained roads, and four BLM-maintained roads (Hualapai Ridge Road, Antelope Wash Road, Big Wash Road, and Hell's Canyon Road). In addition to the major (Federal or State highways) and minor (county, BIA, and BLM) transportation networks, several individuals and private entities hold ROWs to maintain roads on public lands in order to access property and facilities.

Access into the project area is readily gained from all major and minor transportation networks. Subsequent access to BLM-managed roads, primitive roads, trails, and transportation linear assets (i.e., travel routes) is readily available to a wide array of user groups due to the amount of improved and highly maintained roads throughout the project area. Figure 1.5-1 in Appendix E presents a Project Overview map showing land ownership within the KFO boundary. Access restrictions within the project area are associated with lack of ingress and egress off of major transportation corridors and as a result of the intermingled BLM, State, private, Tribal, Bureau of Reclamation, and withdrawn U.S. Army Corps of Engineers lands.

Although access throughout the project area is readily available, issues currently exist with safely navigating across public lands due to a lack of signage, mapping, and ability of BLM to actively monitor and maintain commonly used primitive roads and trails. Some route numbering signage has been placed within the project area, but there is no readily available map for public consumption to aid in traversing public lands. In addition, minor routine maintenance is needed throughout the project area to ensure that regularly accessed routes do not become degraded beyond repair. In general, signage, mapping, and maintenance would aid in not only recreational access across public lands, but also administrative access for wildlife, livestock grazing, minerals, realty, fire, and cultural resource management.

A comprehensive route inventory was completed to the greatest extent possible to include all motorized and non-motorized routes used by the public and for permitted uses within the project area. Within the project area, 17,415 existing routes totaling approximately 5,503 miles were identified and evaluated. The BLM defines and categorizes its linear assets (i.e., travel routes) into the following categories: roads, primitive roads, trails, and transportation linear disturbances. For further information on the route inventory process, as well as the definitions and categories for linear assets, see Appendix C.

The project area has a number of ROWs, as well as permitted and/or leased lands for actions such as utility lines, and private land access. None of these permitted uses would be affected by the alternatives presented in this EA.

3.16. Recreation

Public lands administered by the BLM within the KFO provide a wide-array of recreational and tourism opportunities within the region. Therefore, recreation on public lands is an important contributor to the regional economy. Recreation is a key part of the multiple-use management in the project area. Recreation occurs throughout the project area and includes the following activities:

- Photography
- Backpacking
- Mountain Biking
- Geocaching
- Scenic Touring
- Wildlife Viewing
- Camping
- Dispersed Camping
- Rock Hounding/ Mineral Collection
- Historical Site Visitation
- Trucks / Technical 4WD (OHV)
- ATVs/ utility vehicle (UTVs)(OHV)
- Developed Recreation Sites
- Motorcycles/ Dirt bikes (OHV)
- Hunting
- Hiking
- Target Shooting
- Rock Art Viewing
- Swimming
- Horseback Riding

The KFO provides a wide range of activities and requires multiple-use management in order to minimize conflict. Its proximity to recreational points of interests such as the Colorado River, Grand Canyon, Lake Mead, and Lake Havasu makes it an attractive place to visit. In addition, local residents of Las Vegas, Kingman, Lake Havasu City, and Bullhead City frequently recreate in the area. The relatively warm weather in the winter months makes this area an attractive destination for seasonal residents, known as "snowbirds." In general, outdoor recreation in this type of environment is more pleasant in the cooler winter months than in the summer.

The lower elevations provide recreational opportunities during cooler months and higher elevations are used in the hot summer months. Many geologic, topographic, and historic features provide excellent opportunities for diverse recreation from the vast mountain ranges with scenic vistas, to desert washes and historic mines. The mining industry has built an intricate network of roads and trails, which are now extensively used by a wide-variety of OHV enthusiasts seeking a variety of experiences.

The Kingman area is seeing a trend of shifting from more primitive to more developed (rural) experiences as populations near the project area grow and motorized recreation becomes more popular and accessible. As outdoor recreational use continues to increase on public lands, it is anticipated that the demand for developed recreation sites and open areas for users to disperse would increase accordingly. According to an Arizona State Parks (AZ SP) survey completed in 2003, 26 percent of households in Mohave County are OHV users; greater than the State's 21 percent (AZ SP 2003). Side-by-side OHV use is rising and is

expected to continue to rise into the future for hunting and general travel. The need for ATV/ UTV specific routes could increase in the future, resulting in the need to re-designate trails to consider increased route width and access capabilities required for the impacts specific to side-by-side OHVs.

The Recreation Management Information System (RMIS) is a tool used by the BLM to record number of visits, visitor days, types of activities, permits, and partnerships and agreements for recreation amenities and activities. Special Recreation Permits (SRPs) are issued for commercial uses, competitive events, and organized group use on BLM land. The KFO typically issues SRPs for commercial outfitters for big game hunting, OHV (including ATV, car, and motorcycle) events/races, mountain biking, and horseback riding activities. It is estimated that annual visitation to the project area is 714,392 visits and 557,205 visitor days (BLM 2017f). Figure 3.16-1 in Appendix E illustrates the trend of recreation visits and visitor days during the period 1999 to 2017. For the most part the number of visits has steadily increased, rising to over 700,000 annual visits in 2017, an increase of over 300,000 visits from 2005.

There are four developed recreation sites within the project area that provide expanded amenity camping, hiking, picnicking, and wildlife viewing. These are the Burro Creek, Wild Cow Springs, Windy Point, and Packsaddle recreation sites. Many additional undeveloped access points are located off highways and county roads throughout the project area (Figure 3.16-1, Appendix E). Recreation sites within special recreation management areas (SRMAs) are discussed further below.

3.16.1. Special Recreation Management Areas

Recreation management areas are the primary means of management of recreational use on BLM-managed lands. Six SRMAs exist within the project area. These areas are described in detail in the RMP and shown in Figure 3.16-2, Appendix E. SRMAs involve intensive management to achieve the RMP's recreation objectives. The remainder of the project area is considered an extensive recreation management area (ERMA), which is an administrative unit that requires more flexible management consideration in order to address use, demand, or Recreation and Visitor Services program investments. The Kingman ERMA spans 2,343,470.6 acres or 3,662 square miles. Table 3.16-1 in Appendix B presents the route mileage of the combined SRMAs in the project area.

3.16.2. Recreation Management Zones

A range of settings are available throughout the project area ranging from primitive to urban (BLM 2014). Primitive settings are characteristic of the nine wilderness areas within the KFO that provide opportunities for solitude, primitive camping, backpacking, orienteering, and unconfined recreational opportunities. Back country settings are provided throughout much of the KFO where natural landscapes exist in harmony with modifications, typified by smaller group size, and individual encounters are limited. Back country settings are typically not visited frequently by BLM staff and while some areas may have developed facilities, most areas do not. Middle and Front country settings are found within the KFO near county or BLM maintained roads where access is readily available. In these settings group sizes are larger, individual encounters are higher, and BLM developed sites depicting area locations are more readily available. Rural settings are found within the KFO near smaller communities, such as where BLM-managed lands exist adjacent to private subdivided lands. The potential for residential development is continually present in these areas. Rural settings may have larger group sizes, more frequent individual encounters, and readily available facilities such as gas stations, campgrounds, day-use areas, and other

developed sites. Urban settings are found within the KFO near larger population centers. Urban settings may also be much busier with a wide-array of user groups and larger group size. Nearby facilities associated with urban settings provide an array of amenities.

3.17. Social and Economic Conditions

Social and economic conditions for the project area extend to Mohave and Yavapai counties. Social and economic factors are typically reported at the county level and therefore these counties provide the best representation of the field office. A portion of the KFO is located in La Paz County; however, no major recreation areas managed by the KFO exist within this portion of the field office. Population and visitation trends show an upward increase resulting in increased intensity of use, primarily by OHV users. While not solely reliant on recreation and tourism, these activities are contributors to the overall economies of local communities.

The following demographic statistics, unless otherwise noted, are provided by Headwater Economics' Economic Profile System, which uses published statistics from Federal data sources, including U.S. Bureau of Economic Analysis and U.S. Census Bureau. U.S. Census Bureau data uses American Community Survey (ACS) 5 year estimates; 2015 represents average characteristics from 2011-2015; 2010 represents 2006-2010.

3.17.1. Population

While population skyrocketed in the project area in the 1980s and 1990s, growth has been moderate in recent years. Between the years 2010-2015, population grew 2.1 percent in Mohave County to 203,362 and 3.2 percent in Yavapai to 215,996, compared to the State population growth rate of 6.3 percent. The average age of residents in these counties is approximately 50 years of age, substantially older than the State of Arizona and U.S. population at 36.8 and 37.6 years, respectively. The age category with the largest increase was 65 and over, which makes up an estimated 27 percent of the population.

The only major community within the project area is Kingman with a population of approximately 30,000. Bullhead City (approximately 40,000) and Fort Mohave (approximately 16,000) are located within close proximity to the project area near the border between Arizona and Nevada in Mohave County.

Over the next 25 years, the population in Mohave and Yavapai counties is projected to add more than 100,000 residents each (Arizona Department of Administration 2015). With continued population growth, it is likely that the demand for recreation would also increase within the project area. Figure 3.17-1 in Appendix E illustrates the projected population growth.

3.17.2. Economic and Financial Factors

The primary economic industries by earnings in the project area are government, healthcare and social assistance, and retail trade. Service related industries make up a growing majority of the earning (Table 3.17-1, Appendix B).

Table 3.17-2 in Appendix B reports industries that include travel and tourism employment; industries that are likely to capture revenues from non-locals. Travel and tourism related employment is slightly higher

in the project area than in Arizona overall. There are large differences in gasoline, accommodation, and food industries than compared to the United States, which suggests a stronger tourism industry in the project area.

Federal lands play an important role within the local economy. Mohave County is 70 percent federally managed, with the majority being BLM land; Yavapai County is almost 50 percent federally managed (Table 3.17-3, Appendix B). Of the Federal land in Mohave County, 50 percent is "Type A," which are lands managed primarily for natural, cultural and recreation features. Part of this land area is made up by the Grand Canyon National Park, LMNRA, and Grand Canyon-Parashant National Monument. Other Federal lands include SRMAs and wilderness areas, which also draw visitors to the project area.

The public lands administered by the KFO are primarily contiguous and in large blocks, however some areas have substantial intermingled private lands. In these areas where the terrain allows, private lands have steadily been developed, primarily for residential purposes. These areas are mainly in the Dolan Springs, White Hills, Meadview, and Hualapai Valley areas, and to a lesser extent in the Detrital Valley, Chloride, Hackberry, and Oatman areas. In order to provide access and utilities to these lands it is often necessary to cross public lands.

3.18. Visual Resources

The term "visual resources" refers to the composite of basic terrain, geologic, and hydrologic features, vegetative patterns, and built features that influence the visual appeal of a landscape. This section describes the existing context of the visual environment and assesses the potential impacts from implementation of the Proposed Action and alternatives within the project area.

The BLM has developed formal systems to inventory visual resources on the lands under its jurisdiction, evaluate visual change in the landscape, and manage visual resources under their jurisdiction. The BLM uses the Visual Resource Management (VRM) System (BLM Manual 8400) to classify and manage visual resources on lands under its jurisdiction (BLM 1984). The assignment of one of four VRM classes (Table 3.18-1, Appendix B) becomes an important component of the BLM's RMP for the area.

The project area for visual resources occurs within the administrative boundaries of the KFO. As such, the Kingman ROD and RMP (BLM 1995a) has been reviewed for visual resource management direction. Within the KFO, approximately 392,843 acres (7 percent of the total acreage) are to be managed as VRM Class I and 882,491 acres (17 percent of the total) are to be managed as VRM Class II. The remainder of the KFO is to be managed as VRM Class III (781,928 acres, 15 percent of the total) and Class IV (3,284,344 acres, 61 percent of the total) (BLM 1993) (Figure 3.18-1, Appendix E). Table 3.18-2 in Appendix B provides the existing route miles within each VRM Class for the project area.

In this EA, the visual resources of the KFO are described in terms of the landscape's character, scenic quality, and visual sensitivity. The visual character of the existing visual resources in the project area varies because of the different natural and man-made features or elements in the landscape and the diverse patterns that these elements create when combined. Scenic or visual quality is the visual appeal of a landscape. The landscape has been assessed in terms of its scarcity, and variety of the landform, vegetation, water, color, adjacent scenery, and man-made features and how well these features fit together. Visual sensitivity reflects attitudes and perceptions held by people regarding the landscape and

in general reflect the public's level of sensitivity for noticeable change to the landscape. It recognizes specific places, areas, and features that have visual importance relative to one's home, social, business, and recreation environment. The description of the existing visual character, inherent scenic quality, and relative level of visual sensitivity of the landscape for this EA is based on the recently completed KFO Visual Resource Inventory (VRI) (BLM 2016b).

3.18.1. Landscape Character

The KFO contains diverse scenic landscapes that range from flat valley bottoms and rounded hills to dramatic incised river canyons, irregular boulder fields, and dominant mountain formations (Photograph 3.18-1, Appendix M). Vegetation is generally composed of Mojave Desert species, with a prominence of Joshua trees and saguaros in concentrated areas. Ribbons of riparian vegetation intermittently break through the landscape along the few river corridors in the inventory area. Prominent scenic locations include the historic Route 66 National Back Country Byway, Grapevine Mesa/Joshua Tree Forest NNL, the Hualapai Mountains, and the Black Mountains.

The project area falls within the Colorado Plateau, Transition Zone, and Basin and Range physiographic provinces (Stone 1987). The Basin and Range province is characterized by steep, narrow, isolated mountain ranges (generally on a north-south axis) separated by wide, flat sediment-filled valleys or basins. The landscape in the northeastern portion of the project area occurs within a transition zone between the Basin and Range and Colorado Plateau provinces. The resulting topography consists of broken and scattered landforms and geologic features. Vegetation within the inventory area is varied and contains species associated with the Arizona/New Mexico Plateau, Arizona/New Mexico Mountains, Sonoran Basin and Range, and Mojave Basin and Range ecoregions.

3.18.2. Scenic Quality

The scenic quality of the project area for all lands regardless of jurisdiction/ownership was inventoried as part of the 2016 VRI process with the exception of NPS and Tribal lands (BLM 2016). The relative scenic quality (A, B, or C) is assigned to a landscape by rating the scenic quality evaluation key factors of landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications on a numerical scale. Landscapes considered to have the highest scenic value have a scenic quality rating of A; those with a rating of C are considered to be more common, less distinct landscapes (BLM 1986a). Within the project area, approximately 1,719,751 acres (36[2] percent of the total VRI acreage) are rated as Scenic Quality A commonly associated with large mountainous landforms located along the far western, eastern and central portions of the project area. Of the remaining project area, 1,703,085 acres (35 percent of the total) are Scenic Quality B and 1,376,600 acres (27 percent of the total) are identified as Scenic Quality C (BLM 2016) (Figure 3.18-2, Appendix E). Table 3.18-3 in Appendix B provides the existing route miles within each scenic quality rating for the project area.

3.18.3. Sensitivity Levels

Public lands are assigned high, moderate, or low sensitivity levels by analyzing the various indicators of public concern. These indicators include the types of users; amount of use; public interest; adjacent land

[2] Percentages do not add up to 100 percent due to the fact that VRI boundary does not extend across the entire project area.

uses; special areas that may include Natural Areas, Wilderness areas, Wild and Scenic Rivers, Scenic Areas, and Scenic Roads or Trails; ACECs; and other areas identified through research or studies (BLM 1986a). Within the project area, approximately 1,633,663 acres (34[2] percent of the total VRI acreage) have high sensitivity levels, 2,807,527 acres (58 percent of the total) have moderate sensitivity levels, and 358,246 acres (7 percent of the total) are identified as low sensitivity (BLM 2016) (Figure 3.18-3, Appendix E). Table 3.18-4 in Appendix B provides the existing route miles within each visual sensitivity level for the project area.

4 Environmental Consequences

4.1. Air Quality

The network of motorized routes within the project area varies in width, with some routes creating a wider footprint or two tracks as opposed to a single track for motorcycles or non-motorized travel. Routes located on steep slopes and in areas with fragile soils where vegetation has been removed are vulnerable to disturbance and the displacement of soil particles that can be transported by wind. Routes in these sensitive areas are thus more likely to contribute to fugitive dust generation.

While motorized and non-motorized route use would vary by alternative, dust generation would continue under all alternatives and would likely increase as population and visitor numbers expand. Under all action alternatives, users may see a localized increase in fugitive dust on routes that remain open, which could result from a concentration of users on designated routes. In other words, some route use would be redistributed from the routes that were closed. Conversely, portions of the project area would experience a localized reduction in fugitive dust in the areas where routes would be closed. For all alternatives, routes have been designated within the portion of the Bullhead City PM_{10} Maintenance Area that overlaps with the KFO.

While the TMP determines which routes would be open to motorized use, the TMP has no authority over the level of motorized use within the KFO. Over time, as decommissioned routes naturally re-vegetate, soil erosion and displacement of soil particles would be reduced. Section 4.3 Soil Resources provides a summary of fragile soils by alternative.

4.1.1. Alternative Comparison

Alternative A would not close or restrict use on any of the routes; therefore dust generation on existing routes would continue at a level similar to current conditions but subject to increase in response to visitor and population growth. Under Alternative A, 40.59 miles of open routes would be located within the Bullhead City PM_{10} Maintenance Area that overlaps with the KFO.

Alternative B would have the least mileage of open or limited routes (2,506 miles) and the greatest mileage of closed routes (2,214 miles) located on fragile soils where poor road suitability exists. Fugitive dust generation would diminish in those portions of the project area where routes would be closed. Users, however, would experience the highest increase in fugitive dust on open routes since Alternative B has the highest number of route closures, resulting in increased travel and concentration of users on routes that remain open. Under Alternative B, 7.6 miles of open routes and 31.52 miles of limited routes would be located within the Bullhead City PM_{10} Maintenance Area that overlaps with the KFO.

Alternative C would have fewer miles of closed routes (1,281 miles) than Alternative B and more miles of open and limited routes (3,439 miles) located on fragile soils where poor road suitability exists. As with Alternative B, fugitive dust generation would diminish in those portions of the project area where routes would be closed but to a lesser degree overall than Alternative B. Users would experience an increase in fugitive dust on the remaining open routes due to the concentration of users, however it would be less of an increase than under Alternative B. Under Alternative C, 16.28 miles of open routes and 14 miles of limited routes would be located within the Bullhead City PM_{10} Maintenance Area that overlaps with the KFO.

Alternative D would have the highest mileage of open or limited routes (4,025 miles) and the least mileage of closed routes (695 miles) on fragile soils where poor road suitability exists of the action alternatives. Fugitive dust generation would diminish in those portions of the project area where routes would be closed, but to a lesser degree than the other action alternatives. Alternative D would have fewer miles of closed routes than Alternatives B and C, but more than Alternative A. Fugitive dust generation would continue to be diffused over a larger route network and thus users would experience a lesser concentration of dust on open routes compared to the other action alternatives. Under Alternative C, 24.89 miles of open routes and 5.96 miles of limited routes would be located within the Bullhead City PM_{10} Maintenance Area that overlaps with the KFO.

4.2. Soils

Motorized and non-motorized travel within the project area would result in continued soil compaction and minimal opportunity for vegetation regrowth. Motorized routes vary within the project area, with some routes creating a wider footprint or two tracks as opposed to a single track for motorcycles or non-motorized travel. Routes located on steep slopes and in areas with fragile soils where vegetation has been removed are vulnerable to disturbance and the displacement of soil particles that can be transported by wind, water or other natural and anthropogenic forces. Traveling on routes during the spring season, or other times of year with high soil moisture content (i.e., after a recent precipitation event) could lead to rutting compaction, and decreased infiltration leading to accelerated runoff, erosion, and sedimentation into drainages located within the project area. Continued use of routes on steep slopes would also increase runoff and erosion, which could lead to the formation of rills and gullies if left unmitigated.

Over time, as decommissioned routes naturally re-vegetate, soil erosion could be reduced if infiltration is not greatly reduced from compaction. Decommissioned routes that are mechanically de-compacted may re-vegetate more rapidly than those left to naturally reclaim. Seasonal closures during the summer could provide a beneficial effect to soil resources due to the reduced potential for compaction, rutting, and erosion during the wettest periods of the year (U.S. Climate Data 2018).

Table 4.2-1 in Appendix B provides a summary of fragile soils by alternative and Tables 4.2-2 through 4.2-4 (Appendix B) provide summaries of soil suitability and limitations for natural surface roads by alternative. Fragile soils presented in Table 4.2-1 include highly fragile, moderately fragile, and fragile soils as defined in the NRCS Fragile Soil Index (NRCS 2017). Table 4.2-2 provides a summary of route miles that intersect soils that have either a severe or moderate erosion hazard as defined by NRCS (NRCS 2017). Table 4.2-3 in Appendix B provides a summary of route miles that intersect soils that have either a severe or moderate wind erosion hazard as defined by NRCS (NRCS 2017). Table 4.2-4 in Appendix B provides a summary of route miles with moderate or poor road suitability based on soils data

(NRCS 2017). Drainage crossings are a key contributor of sediment to waterways. Sediment transport can be reduced by road maintenance, including installation of culverts where appropriate and other best management practices (BMPs). Reductions to sediment transport would be identified on a case-by-case basis and may be subject to an additional NEPA analysis.

4.2.1. Alternative Comparison

Alternatives A through D would have different route lengths and limitations on fragile and other sensitive soils in the project area. Alternative A would have the greatest impact on fragile soils and the greatest mileage of open routes on soils with erosion hazards and poor road suitability. Alternative B would have the least mileage of open or limited routes and the greatest mileage of closed routes located on fragile soils, soils with erosion hazards and poor road suitability. Alternative C would have fewer miles of closed routes than Alternative B and more miles of open and limited routes located on fragile soils, soils with erosion hazards and poor road suitability. Alternative D would have the highest mileage of open or limited routes on fragile soils, soils with erosion hazards, and poor road suitability of any of the action alternatives. Alternative D would have fewer miles of closed routes than Alternatives B and C, but more than Alternative A.

4.3. Surface Water and Water Quality

The primary impacts to surface water quality from travel activities result from erosion on roads and trails that increases sedimentation in nearby waterways. Fluid spills from motor vehicles that may contain hazardous chemicals can impact water quality. In order to compare these potential effects on waterways in the project area, the number of times any route crosses a waterway was calculated for each alternative. Tables 4.3-1 and 4.3-2 in Appendix B summarize the number of route crossings for both perennial and intermittent waterways by each alternative. Under each of the alternatives, routes designated for closure would be decommissioned and rehabilitated in a phased fashion and would focus primarily on passive restoration techniques. Passive restoration is accomplished by closing a route to further use and allowing it to reclaim naturally. Active restoration techniques may also be employed, including hand-raking and cutting track edges or berms to break up straight lines, placing rocks on routes, and vertical mulching of routes with local vegetation or dead plant materials. The goal would be to blend the disturbed area into the landscape. Restoration would allow for vegetation re-establishment over time, which would help to reduce sedimentation in adjacent waterways. It is expected that the legacy of soil compaction would persist after restoration and hydrologic functions such as infiltration would not be fully restored on closed routes for years to come.

4.3.1. Alternative Comparison

Under Alternative A, no changes would be made to access or use within the project area. Alternative A would have the highest number of waterway crossings of the alternatives. Erosion and sedimentation would be expected to continue at current levels. Travel on roads near drainages and at crossings could elevate total suspended sediment concentrations and turbidity in downslope waterbodies during runoff. The potential for water quality impacts from spills of fluids (such as petroleum products) from motorized vehicles would be slightly higher under Alternative A due to the higher number of waterway crossings. Alternative B would have the lowest number of waterway crossings and provide for increased protection of soil and water resources. Alternative C has fewer crossings than Alternative A or D which would

reduce erosion and sedimentation to waterways and provide a beneficial effect to surface water and water quality. Alternative D would have minimal restrictions on use type. Alternative D would have the highest number of waterway crossings, as compared to Alternatives B and C, but less than Alternative A. The higher number of crossings would also increase human access to surface water, which increases the potential for water quality impacts from human-generated sources and spills of fluids from motorized vehicles.

4.4. Vegetation

The analysis of effects to vegetation communities associated with each alternative was conducted by calculating and evaluating the route miles of open, limited, and closed routes within each vegetation type (Tables 4.4-1 to 4.4-7, Appendix B). The presence of fugitive dust created by travel on unimproved routes would be a common impact to vegetation under all alternatives. Dust generated by passenger vehicles and OHVs could settle on vegetation, affecting photosynthesis, respiration, and transpiration, which could result in reduced vigor (Spellerberg and Morrison 1998). Vegetation mortality may change the structure and composition of the overall community. Dust from roads that have been improved by bringing in surface material may change the surrounding soil chemistry creating unfavorable conditions for native vegetation and encouraging noxious weed proliferation. The effects to vegetation communities from fugitive dust would be minor both in the short and long term.

Additional effects to vegetation communities common to all alternatives would include introduction of invasive species from vehicles, horses, and hikers. Damage to or loss of individual plants could affect community structure and diversity, which in turn would affect plant communities and habitat suitability for wildlife. Ruts created by OHVs could disrupt hydrologic flow and increase potential for erosion. Motorized travel would have both short and long term moderate effects to vegetation communities.

Implementation of the action alternatives would result in varying levels of use within the project area that could result in associated levels of impacts to vegetation; however, some impacts to vegetation would continue under all alternatives. Route closure would not equate to immediate improvement in vegetation conditions; however, after reclamation of closed routes is completed, vegetation conditions could improve. There would be long-term beneficial effects as a result of route closures, such as reductions in fugitive dust and damage from trampling by humans. Short-term negative impacts would include temporary minor ground disturbance, soil compaction, introduction of non-native species, and vegetation manipulation caused by actions associated with route closures. These actions could include sign and barrier insulation, general ground disturbance, and hand raking. Potential impacts from non-native plants would be common to all alternatives and consistent with the effects analyzed in Section 4.5, Noxious Weeds and Invasive Plants, including distributing seed and existing infestations.

Further information regarding the potential environmental consequences of vegetation can be found in Appendix K.

4.4.1. Alternative Comparison

By leaving more routes open, Alternative A would have more long-term adverse impacts to vegetation communities compared to Alternatives B, C, and D. Alternative B would result in the closure of 2,719.28 miles of routes, with an additional 1,065.49 miles designated as limited. Alternative B would

have the greatest long-term beneficial effect to vegetation communities and the most short-term, minor adverse impacts from reclamation activities compared to Alternatives A, C, and D. Alternative C would close over 1,624 miles of routes with an additional 553.8 routes designated as limited. Overall, implementation of Alternative C would result in a long-term, beneficial effect on vegetation communities in the project area. Alternative C would have long-term beneficial effects to vegetation communities from route closures and short-term minor adverse impacts associated with ground-disturbing reclamation activities. These impacts would be greater than those under Alternatives A and D and less than those under Alternative B. Implementation of Alternative D would result in the closure of 830.29 miles of routes, with an additional 206.25 routes designated as limited. This alternative would have long-term beneficial effects to vegetation communities from route closures and short-term minor adverse impacts associated with ground-disturbing reclamation activities. These impacts would be greater than those under Alternative A, and less than those under Alternatives B and C.

4.5. Noxious Weeds and Invasive Plants

Under all of the alternatives, travel by OHV, non-motorized, and equestrian users through existing noxious weeds would continue to pose a risk of distributing seed and plant parts to currently un-infested areas. Implementation of the action alternatives would result in varying changes in use within the project area that could result in a reduction in interactions with noxious weed infestations, however, the risk of continuing weed problems would continue under all alternatives. Route closure does not necessarily equate to improvement in noxious weed conditions. However, over time it is anticipated that with route closure, surface disturbance would be reduced which would enhance the density and cover of native species, resulting in the routes returning to a more natural condition and potentially a diminishment of weed concentrations. Native plant species cover inhibits the growth and establishment of noxious weed and invasive plants. Reclamation treatment efforts would enhance native plant species restoration and thus potentially reduce weed concentrations. A reduction in length and density of the route network would also reduce the potential for interaction with existing infestations and introduction of noxious weeds to previously un-infested areas. Routes that remain open within and adjacent to existing infestations would still create a potential for spread of seed and plant parts. However, a reduced network under the action alternatives would likely reduce the risk of infestations in new areas. Further information regarding the environmental setting of noxious weeds and invasive plants can be found in Appendix K.

4.5.1. Alternative Comparison

By leaving the most travel routes open, Alternative A presents the greatest risk of continuing weed problems of any of the alternatives. Alternative B would result in the closure of 2,718.5 miles of routes, with an additional 1,065.23 miles designated as limited. Alternative B would help to preserve and protect resources within the project area and result in the greatest potential long term, beneficial effect on the reduction and spread of noxious weeds in the project area. Alternative C would close over 1,624 miles of routes with an additional 553.8 routes designated as limited. Implementation of Alternative C would result in a long term management on the control and reduction of noxious weeds in the project area. Implementation of Alternative D would result in less improvement on the control and reduction of noxious weeds in the project area when compared to Alternatives B and C, but more than Alternative A.

4.6. Wildlife

4.6.1. Terrestrial Wildlife

Routes and their associated use can have a variety of impacts to wildlife and wildlife habitat. Habitat impacts from routes and their associated use include: habitat degradation (for example, edge effects and spread of non-natives), fragmentation, and increased fire risk. Routes impact individual animals through impeding movement (barriers), causing mortality (vehicle collisions, diseases), and causing disturbance (noise and human presence). The spread of non-native plants would impact wildlife habitat, consistent with the effects analyzed in Section 4.5, Noxious Weeds and Invasive Plants.

Edges can have negative consequences for wildlife by modifying distribution and dispersal and by increasing incidence of nest predation and parasitism. Edges also may be detrimental to species requiring large undisturbed areas, because increases in edge generally result in reductions in size and possible isolation of patches and corridors (Yahner 1988). For instance, edges created by roads can fragment suitable habitat for various species of small mammals (Garland and Bradley 1983), pronghorn (Sawyer and Rudd 2005), and desert tortoise (Boarman 2002), separating wildlife populations on either side of the road, which reduces fitness of the population.

The physical presence and nature of roads is a direct impact to wildlife species through fragmenting important habitats, which can become compounded when numerous networks are created. Consequences of fragmented habitats can lead to a reduction in total area of available habitat and remnants that become isolated to varying degrees (Saunders et al. 1991). Landscape fragmentation can also alter habitat complexity as it results in loss of original habitat, a decrease in patch size, and increase in distance between patches (Wilcox and Murphy 1985).

A study conducted in 1999 found that ambient noise can reduce species richness in areas of high ambient noise (Stone 2000). This study supports a hypothesis first proposed by Krause (1987) called the “Niche Hypothesis.”, which basically states that birds and other wildlife may be affected by human-induced pollution. Krause feared that introducing constant noise such as vehicles, aircraft, chainsaws, highways, etc., may lead to a decreased ability for birds to effectively communicate during territorial and breeding behaviors. Krause found strong evidence to support his hypothesis and determined that bird survival may be impaired due to the masking effect caused by excessive noise levels (Krause 1987). Noise pollution created by OHVs can produce extremely loud decibel levels (dB), some ranging as loud as 100 dB, which may cause hearing loss in humans after a sustained time.

Many different factors contribute to road-related wildlife deaths, but some of the higher frequencies evolve around the density of use and the width of the road (Underhill and Angold 2000), with the greatest threat being direct mortality from vehicle collisions (Bissonette and Rosa 2009). Effects appear greatest with regard to larger animals, those which may have declining or restrictive distributions, as well as those who may be in regular contact with roads due to migratory paths (Bennett 1991). Many animals that become seriously injured will seek cover and die out of sight. Because of scavenging combined with destruction of carcasses by passing vehicles, death rate tolls may at times be difficult to obtain or estimate (Mytty 2004; Underhill and Angold 2000).

The KFO provides shelter and foraging habitat year-round for various big game species (e.g., desert bighorn sheep, pronghorn, mule deer, elk, javelina) (J. Acton, pers. comm., BLM Acting Wildlife Biologist, 2018). Travel routes cross big game habitat and result in habitat fragmentation, limiting the ability of big game animals to travel freely within and between habitat patches. Route closures would have a long-term moderate beneficial effect to big game. Restoration activities could have short-term minor negative effects and long-term beneficial effects to big game. Quantitative data for most wildlife species present in the Kingman Field Office are unavailable; however, data on bighorn sheep habitat are available and will be included in the analysis of alternatives below. Tables 4.6-1 to 4.6-6 in Appendix B provide a breakdown of bighorn sheep habitat impacts by alternative.

Further information regarding the environmental consequences of terrestrial wildlife can be found in Appendix K.

4.6.1.1. Alternative Comparison

Alternative A would have more long-term adverse impacts to terrestrial wildlife compared to Alternatives B, C, and D because this alternative does not include any route closures. Alternative B would result in the closure of 2,719.28 miles of routes, with an additional 1,065.49 miles of routes that would become designated as limited access. Over 214 route miles would be closed within bighorn sheep habitat, including 38.97 miles within high value habitat and 1.53 miles within lambing grounds. Access to bighorn sheep habitat would be reduced by 63 percent compared to Alternative A. Alternative B would have the greatest long-term beneficial impacts to terrestrial wildlife habitat from route closures. Alternative C would close over 1,624 miles of routes with an additional 553.8 routes designated as limited. Nearly 128 miles of routes in bighorn sheep habitat would be closed under this alternative and almost 60 miles of routes would be designated as limited access, reducing human access to bighorn sheep habitat by 45 percent. Alternative C would have long-term beneficial impacts to terrestrial wildlife from route closures. Beneficial impacts would be greater than those under Alternatives A and D and less than those under Alternative B. Implementation of Alternative D would result in the closure of 830.29 miles of routes, with an additional 206.25 miles of routes being designated as limited. Over 78 miles of routes in bighorn sheep habitat would be closed and more than 25 miles would be designated as limited access. Human access to bighorn sheep habitat would be reduced by 25 percent under Alternative D. This alternative would have long-term beneficial impacts to wildlife habitat from route closures. These impacts would be greater than those under Alternative A, and less than those under Alternatives B and C.

4.6.2. Aquatic Wildlife

Aquatic wildlife species and their habitats are typically limited to perennial streams and some intermittent streams. Potential effects to aquatic wildlife would be common to all alternatives and consistent with the effects analyzed in Section 4.3, Surface Water and Water Quality, including sedimentation and water quality degradation. Impacts to aquatic wildlife habitats from non-native plants would be common to all alternatives and consistent with the effects analyzed in Section 4.5, Noxious Weeds and Invasive Plants.

Roads alter physical conditions on, and areas adjacent to them (Trombulak and Frissell 2000). Roads density and number of miles in a watershed can greatly alter the physical aspects of a watershed such as slope, hydrology of slopes, surface runoff, coarse and fine sediment loading and transport, ground water supply and transport, flood plains, channel morphology, stream hydrology, and in stream physical

conditions (Richardson et al. 1975; Furniss et al. 1991; Harding et al. 1998; and Trombulak and Frissell 2000). In turn, these physical alterations create direct and indirect effects that can have serious consequences for the bio-integrity of watersheds that lie within these road networks.

Roads intercept natural and road-network-altered runoff, concentrating it into gullies and channels that can be funneled into streams, especially at road crossings, altering hydrologic timing, stream discharge, channel morphology, and increasing erosion of stream banks. Effects of these processes once begun can have ramifications many kilometers up and downstream (Hicks et al. 1991).

Large particles of sediment fill pools (Roni et al., 2002), whereas fine sediment clog interstitial spaces and cause fish egg mortality (Everest et al. 1987; Gresswell and Varley 1988; Furniss et al. 1991; and Roni et al. 2002). Sedimentation is directly related to a decrease in benthic macroinvertebrate species richness and diversity (Wood and Armitage 1997; Newcombe and MacDonald 1991). Similarly, sedimentation affects development, growth, and survival of various life stages of fish (Newcombe and MacDonald 1991; Lisle and Lewis 1992; Rieman and McIntyre 1995). Suspended, fine, and coarse sediments have direct effects on hatching rates of embryos, growth, and survival of fish (Lisle and Lewis 1992; Scrivener and Brownlee 1989; Shaw and Richardson 2001; Rinne 1980; Rinne 1982; Rinne and Calamusso 2007; Minckley and Marsh, 2009).

Further information regarding the environmental consequences of aquatic wildlife can be found in Appendix K.

4.6.2.1. Alternative Comparison

Perennial and intermittent stream crossings by alternative are presented in Table 4.3-1 and Table 4.3-2 in Appendix B. Alternative A would result in 5,457.24 miles of open routes with 4 perennial and 772 intermittent stream crossings, and 36.22 miles of routes designated as limited access. Compared to Alternatives B, C, and D, Alternative A would have more long-term adverse impacts to aquatic wildlife compared to Alternatives B, C, and D, primarily because it does not include any route closures. Alternative B, when compared to Alternative A, this alternative would substantially reduce route access to aquatic wildlife habitats. Alternative B would result in the closure of 2,719.28 miles of routes, with an additional 1,065.49 miles of routes that would become designated as limited access. Under Alternative B open routes would not cross any perennial streams and would cross 221 intermittent streams. Alternative B would have the most long-term beneficial impacts to aquatic wildlife. Alternative C, compared to Alternatives A and D, would have fewer open routes under this alternative. Alternative C would result in the closure of 1,624.90 miles of routes, with an additional 554.2 miles of routes that would be designated as limited access. Under Alternative C open routes would cross 2 perennial streams and 500 intermittent streams. Alternative C would have long-term beneficial impacts to aquatic wildlife from route closures. These impacts would be greater than those under Alternatives A and D and less than those under Alternative B. Implementation of Alternative D would result in the closure of approximately 830.29 miles of routes, with an additional 206.25 routes being designated as limited. Under Alternative D open routes would cross 2 perennial streams and 649 intermittent streams. This alternative would have long-term beneficial impacts to aquatic wildlife from route closures, which would be greater than those under Alternative A but less than Alternatives B and C.

4.6.3. Migratory Birds

Under all of the alternatives, travel by OHV and other users would continue to pose a risk of habitat damage. However, there would be long-term beneficial effects as a result of route closures. Impacts to migratory bird habitats from non-native invasive plants common to all alternatives are consistent with the effects analyzed in Section 4.5, Noxious Weeds and Invasive Plants, including distributing seed and existing infestations, though some non-native plants provide good habitat for migratory birds.

As discussed above for terrestrial wildlife, routes and their associated use can have a variety of impacts to birds and their habitat. Impacts to migratory bird habitat from routes and their associated use include: habitat degradation (for example, edge effects and spread of non-natives), fragmentation, and increased fire risk. Routes impact individual animals through impeding movement (barriers), causing mortality (vehicle collisions, diseases), and causing disturbance (noise and human presence). Additional details are included above in the terrestrial wildlife discussion. Further information regarding the environmental consequences of migratory birds can be found in Appendix K.

4.6.3.1. Alternative Comparison

Alternative A would result in 5,457.24 miles of open routes and 36.22 miles of routes designated as limited access. By leaving more routes open, Alternative A would have more long-term adverse impacts to migratory birds compared to Alternatives B, C, and D because this alternative does not include any route closures. Alternative B would reduce route access to migratory bird habitats through the closure of 2,719.28 miles of routes, with an additional 1,065.49 miles of routes that would become designated as limited use. Alternative B would have the most long-term beneficial impacts to migratory birds of any of the alternatives. Alternative C would result in the closure of 1,624.90 miles of routes, with an additional 554.2 miles of routes that would be designated as limited. Alternative C would have long-term beneficial impacts to migratory bird habitat from route closures, which would be greater than those under Alternatives A and D and less than those under Alternative B. Implementation of Alternative D would result in the closure of approximately 830.29 miles of routes, with an additional 206.25 routes being designated as limited. This alternative would have long-term beneficial impacts to migratory bird habitat, which would be greater than those under Alternative A but less than Alternatives B and C.

4.7. Special Status Species

Potential impacts to special status plants and animals would be consistent with the effects analyzed in Section 4.4 Vegetation and Section 4.6 Wildlife. Due to special status species typically having smaller populations and being more sensitive to disturbance, there may be a greater impact to these species. Under all of the alternatives, travel by OHV and other users would continue to pose a risk of habitat damage and potential loss, as well as cause disturbance due to noise and human presence. A description of the impacts to special status species under each alternative is provided below. Further information regarding the environmental consequences of special status species can be found in Appendix K.

4.7.1. Federally Listed Species

The analysis of effects to federally listed species was conducted by calculating and evaluating the miles of open, limited, and closed routes within occupied, potential, and/or critical habitat for each species under

each alternative (Tables 4.7-1 to 4.7-8, Appendix B). Further information regarding the environmental consequences of federally listed species can be found in Appendix K.

4.7.1.1. Alternative Comparison

Under Alternative A, 3,070 miles would be designated as open routes through habitat for federally listed wildlife species. This can result in disturbance to individuals during the breeding season, which may cause them to avoid suitable habitat and possibly abandon nests. Federally listed plants could be damaged or destroyed by recreational users. Compared to Alternatives B, C, and D, Alternative A would have more long-term adverse impacts to federally listed species and their habitats, including critical habitat, because this alternative does not include any route closures through sensitive areas. Under Alternative B, no routes would remain open in critical or occupied habitat. Compared to Alternatives A, C, and D, this alternative would have the greatest long-term benefit to federally listed species and their habitats, including critical habitats.

Because reclamation activities associated with closing routes could impact southwestern willow flycatchers, yellow-billed cuckoos, and Mexican spotted owls during the breeding season, and northern Mexican gartersnakes and Arizona cliffrose plants during any time of year, the following mitigation measures would be implemented to avoid or reduce potential impacts:

- Restoration and rehabilitation activities or any other ground-disturbing activities would not be conducted on routes through suitable or critical habitat for the southwestern willow flycatcher (i.e., April 15 through August 31), suitable and proposed critical habitat for the yellow-billed cuckoo (i.e., May 15 through September 30), and suitable habitat for the Mexican spotted owl (i.e., March 1 through August 31) during the breeding season.
- For all restoration and rehabilitation activities that would occur within northern Mexican gartersnake habitat, crews would be provided with training material on identifying the northern Mexican gartersnake and on what to do if a northern Mexican gartersnake is observed in the project area. Crews would be instructed not to touch or handle snakes of any species; avoid filling in or crushing burrows and crevices at the base of trees or between large rocks and boulders; and avoid moving large rocks, boulders, and logs when working within northern Mexican gartersnake habitat. The training materials would also include field guide materials, natural history literature, photographs, maps, comparison to other common snakes, contact lists, and instructions for collecting photo-documentation.
- Surveys would be conducted within 30 days prior to sign installation, restoration and rehabilitation activities, or any other ground-disturbing activity within Arizona cliffrose habitat. Any Arizona cliffrose plants detected would be marked and avoided during these activities.

Under Alternative C, the mitigation measures identified under Alternative B would also apply under this alternative. Alternative C would have long-term beneficial impacts to federally listed species and their habitats, including critical habitats, from route closures. These beneficial impacts would be greater than those under Alternatives A and D and less than Alternative B. Under Alternative D, the mitigation measures identified under Alternative B would also apply under this alternative. Alternative D would have long-term beneficial impacts to federally listed species and their habitats, including critical habitats, from route closures. These beneficial impacts would be greater than those under Alternative A, and less than Alternatives B and C.

4.7.2. BLM Sensitive Species

Effects to BLM sensitive species are analyzed based on the route miles proposed within vegetation types as described in Section 4.4 Vegetation. Travel route designations and closures would have an effect on wildlife habitat and therefore an effect on sensitive species with the potential to occur in those habitat types. Of the BLM sensitive species potentially present in the project area, specific quantitative data on miles of routes proposed within suitable habitat are only available for lowland leopard frog, Sonoran desert tortoise, and Hualapai Mexican vole (Tables 4.7-9 through 4.7-11 in Appendix B).

4.7.2.1. Alternative Comparison

Open routes through sensitive species habitat can result in disturbance to individuals during the breeding season, which may cause them to avoid suitable habitat and possibly abandon nests or dens. Compared to Alternatives B, C, and D, Alternative A would have more long-term adverse impacts to sensitive species and their habitats because this alternative does not include any road closures through sensitive areas and would designate 3,039 miles as open routes. Compared to Alternatives A, C, and D, Alternative B would have the greatest long-term benefit to the BLM sensitive species and their habitats. Alternative C would have long-term beneficial impacts to BLM sensitive species and their habitats from route closures. These beneficial impacts would be greater than those under Alternatives A and D and less than those under Alternative B. Alternative D would have long-term beneficial impacts to BLM sensitive species and their habitats from route closures. These beneficial impacts would be greater than those under Alternative A, and less than those under Alternatives B and C.

4.8. Livestock Grazing

The availability of motorized access to monitoring locations, range improvements, and livestock management is essential to the 85 permitted grazing allotments within the project area. These allotments total 2,471,000 acres of public land and produce 129,399 permitted AUMs. Routes identified as important for rangeland management, either by grazing permittees (during scoping) or by BLM Rangeland Management Specialists, were carefully analyzed during the development of alternatives to ensure all access needs are maintained, either by open or limited designations. The total miles of open, limited, or closed routes vary by alternative; however, essential access for livestock operations would remain available under all alternatives.

The closure of routes allows passive vegetation restoration, which results in increased forage opportunities for livestock. Conditions of grazing permits and essential access routes would not be altered by any actions under this plan. Table 4.8-1 in Appendix B provides the route mileage, usage limitations, and route density within grazing allotments under each alternative.

The closure of some routes benefit forage availability and AUMs through increases in vegetation production and composition on routes that are no longer available for motorized travel. The beneficial effects of route closures on forage availability would vary depending on soil type, level of initial disturbance, and ability of the site to restore. Disturbance to the vegetation communities that provide livestock forage is discussed in Section 4.4, Vegetation. Closing underutilized routes allows BLM to focus resources on management of open and limited routes. The types of impacts to livestock grazing and rangeland management from motorized travel on public lands that are common to all alternatives include the potential for vandalism of facilities, intentional and/or unintentional harassment of livestock,

inadvertent disruptions to livestock management operations (i.e., cutting fences and leaving gates open), and impacts to soils and vegetation.

4.8.1. Alternative Comparison

As presented in Table 4.8-1 (Appendix B), Alternatives A through D would have different route lengths, limitations, and densities within the 85 grazing allotments in the project area. Based on this analysis, Alternative A would have the greatest mileage of open or limited routes and the least mileage of closed routes within grazing allotments in the project area. Alternative A would have the highest route density within grazing allotments. Alternative B would have the least mileage of open or limited routes and the greatest mileage of closed routes within grazing allotments. Alternative B would have the lowest route density of the four alternatives. Alternative C would have fewer miles of closed routes within grazing allotments than Alternative B, but more than Alternatives A and D. Alternative C would have more miles of open and limited routes within grazing allotments than Alternatives A and D, but fewer than Alternative B. Route density would be higher than Alternative B, but less than Alternatives A and D. Alternative D would have the highest mileage of open or limited routes within grazing allotments, as well as the highest route density of the action alternatives. Alternative D would have fewer miles of closed routes than Alternatives B and C, but more than Alternative A.

4.9. Lands with Wilderness Characteristics (Inventoried)

As described in Section 3.9, 28 units totaling 539,289 acres have been inventoried by the KFO for the presence of wilderness characteristics. All of the action alternatives would result in a substantial level of route closures in areas identified as having potential wilderness characteristics when compared to the current condition resulting in the potential improvement of the area's naturalness (affected primarily by the forces of nature), opportunities for solitude or a primitive and unconfined type of recreation, and supplemental values (ecological, geological, or other features of scientific, educational, scenic, or historical value). In addition to these elements of wilderness characteristics, the minimum size criteria of 5,000 acres of "Roadless" (not containing highway, county, or mechanically maintained BLM roads) BLM managed lands must be met to manage an area for wilderness characteristics in a future RMP-level decision. Proposed route designations, such as "open" or "limited" could affect the size an inventoried area shown to have potential lands with wilderness characteristics, especially if that area is near 5,000 acres. For purposes of this analysis, only impacts to the units shown to have the potential for wilderness characteristics would be considered, as units identified as not possessing wilderness characteristics in an inventory would not be managed as such in the future. Table 4.9-1 in Appendix B presents route mileage, usage limitations, and route density within the areas (shown cumulatively) inventoried and identified as possessing wilderness characteristics.

4.9.1. Alternative Comparison

As presented in Table 4.9-1 in Appendix B, Alternatives A through D would have different route lengths, types, and densities with areas inventoried and identified as possessing wilderness characteristics in the project area. In general, the greater the length of open routes and route densities, the greater the adverse impacts to the manageability of areas inventoried and identified as possessing wilderness characteristics and the elements (size, naturalness, opportunities for solitude or a primitive and unconfined type of

recreation, and supplemental values) of those areas that substantiate the finding of the area as possessing wilderness characteristics.

Adverse effects from the four alternatives can be measured in how the proposed route designations impact the size, naturalness, opportunities for solitude or a primitive and unconfined type of recreation, and supplemental values. Impact indicators for each of these are listed in Appendix H.

Alternative A would not modify existing route designations and would result in the greatest mileage of open routes and the least mileage of closed routes within the areas identified as possessing wilderness characteristics. This alternative would have the greatest route density within inventoried potential lands with wilderness characteristics of the four alternatives and result in the highest level of adverse effects based on the impact indicators shown in Appendix H. Alternative B would have the least mileage of open and limited routes and the greatest mileage of closed routes of the three action alternatives. Therefore, Alternative B would have the least amount of adverse effects of the four alternatives as overall route density would be lessened in areas that have been inventoried and identified as having potential for wilderness characteristics. Under Alternative B, RMP decisions related to the allocation and subsequent management of lands with wilderness characteristics would be least impacted. Alternative C would have more open and limited routes than Alternative B, but less than Alternatives A and D. Alternative C would also have more miles of closed routes than Alternatives A and D, but less than Alternative B. Alternative C would have more adverse effects on the manageability of inventoried lands with wilderness characteristics in a future RMP decision than Alternative B, but less than Alternative A and D. Alternative D provides a greater amount of open and limited routes than Alternatives B and C, but less than Alternative A. Alternative D would have more of an adverse effect on the manageability of inventoried lands with wilderness characteristics in a future RMP decision than Alternatives B and C, but less than Alternative A. The ranking of alternatives (greatest to least) relative to beneficial effects on inventoried lands with wilderness characteristics and future management allocations would be: Alternative B, Alternative C, Alternative D, and Alterative A.

4.10. Areas of Critical Environmental Concern

Managing ACECs to protect and prevent damage to the resources and values for which they were designated is part of BLM's multiple-use mission. As described in Section 3.10, the 12 ACECs within the project area were designated to protect and enhance biological ecosystems, sensitive species, scenic values, and culturally important areas. Routes to, and within these areas provide important public access for their use and enjoyment. Adverse impacts and beneficial effects from routes and route usage on the various ACEC resources and values are also described in Sections 4.4, Vegetation; 4.5, Noxious Weed and Invasive Plants; 4.6, Wildlife; 4.7, Special Status Species; 4.12, Cultural Resources; and 4.14, Paleontological Resources. Table 4.10-1 in Appendix B presents the route mileage, usage limitations, and route density within ACECs under each alternative. All of the action alternatives would result in a substantial level of route closures, which would improve the scenic and ecological integrity of the landscape, improve plant and wildlife habitat, and protect cultural resources within ACECs by reducing traffic and allowing them to passively restore to their native state. By closing routes that are underutilized, BLM can concentrate resources on managing open and limited routes. Implementing usage limitations on routes would also benefit the sensitive wildlife and plant species for which many ACECs are designated. Closures may potentially increase traffic flow outside of ACEC areas. Managing public

access on routes within ACECs that are designated to protect cultural resources would enhance the visitor experience of these areas.

4.10.1. Alternative Comparison

As presented in Table 4.10-1 (Appendix B), Alternatives A through D would have different route lengths, types, and densities within the 13 ACECs in the project area. In general, the greater the length of open routes and route densities, the greater the adverse impacts on ACECs and the resources and values for which they were established.

Alternative A would not modify existing route designations and would result in the greatest mileage of open or limited routes and the least mileage of closed routes within ACECs. Considering the action alternatives, this alternative would have the greatest route density within ACECs of the four alternatives and result in the highest level of adverse effects. Alternative B would have the least mileage of open or limited routes and the greatest mileage of closed routes within ACECs. This alternative would have the lowest route density of the four alternatives and the least level of adverse effects. Alternative C would have more miles of closed routes and fewer miles of open and limited routes within ACECs than Alternatives A and D. Route density would be greater than Alternative B, but less than Alternatives A and D. Alternative D would have the second greatest mileage of open or limited routes within ACECs and the second greatest route density. Alternative D would have fewer miles of closed routes than Alternatives B and C, but more than Alternative A. The ranking of alternatives (greatest to least) relative to beneficial impacts to ACEC resources and values is: Alternative B, Alternative C, Alternative D, and lastly, Alternative A.

Results for each ACEC are summarized in Table 4.10-1, Appendix B. Note that the comparisons of route density were calculated using the miles of open routes remaining in each ACEC following route closures.

4.11. National Natural Landmarks

As described in Section 3.12, the Grapevine Mesa Joshua Trees Forest NNL was designated as a NNL after a determination was made that the area possessed national significance. Routes to, and within, this area provide important public access for use and enjoyment of this NNL. Adverse impacts and beneficial effects from routes and route usage on the various landmark resources and values are also described in Sections 4.4, Vegetation; 4.5, Noxious Weed and Invasive Plants; 4.6, Wildlife; 4.7, Special Status Species; 4.12, Cultural Resources; and 4.14, Paleontological Resources. Table 4.11-1 in Appendix B presents the route mileage, usage limitations, and route density within the Grapevine Mesa Joshua Trees Forest NNL under each alternative. All of the action alternatives would result in a substantial level of route closures, which would improve the scenic and ecological integrity of the landscape, improve plant and wildlife habitat, and protect cultural resources within the NNL by reducing traffic and allowing the area to passively restore to its native state. By closing routes that are underutilized, BLM can concentrate resources on managing open and limited routes. Implementing usage limitations on routes would also benefit the sensitive wildlife and plant species, primarily the dense stands of multi-aged Joshua trees that are part of the outstanding biological resources for which the NNL was designated. Managing public access on routes within the NNL would enhance the visitor experience of these areas.

4.11.1. Alternative Comparison

As presented in Table 4.11-1 (Appendix B), Alternatives A through D would have different route lengths, types, and densities within the NNL in the project area. In general, the greater the length of open routes and route densities, the greater the adverse impacts on the NNL and the resources and values for which it was established. Routes designated as limited within the NNL are limited to administrative and authorized users.

Alternative A would not modify existing route designations and would result in the greatest mileage of open routes and the least mileage of closed routes within the NNL. This alternative would have the greatest route density within the NNL of the four alternatives and result in the highest level of adverse effects. Alternative B would have the least mileage of open or limited routes and the greatest mileage of closed routes within the NNL. This alternative would have the lowest route density of the four alternatives and the least level of adverse effects. Alternative C would have fewer miles of closed routes within the NNL than Alternative B, but more than Alternatives A and D. Alternative C would have more miles of limited routes within the NNL than Alternative A and the same as Alternative D. Alternative C has fewer limited routes but more open routes than Alternative B. Route density would be greater than Alternative B, but less than Alternatives A and D. Alternative D would have the second greatest mileage of open or limited routes within the NNL and the second greatest route density. Alternative D would have fewer miles of closed routes than Alternatives B and C, but more than Alternative A. The ranking of alternatives (greatest to least) relative to beneficial impacts to NNL resources and values would be: Alternative B, Alternative C, Alternative D, and lastly, Alternative A.

4.12. Cultural Resources

As described in Section 3.12, the project area contains a variety of known cultural resources from both the prehistoric and historic periods. Cultural resources are also being analyzed as part of the Section 106 compliance process. A Class I cultural resources inventory was initiated in October 2017 to identify known cultural resources located along routes in the project area. As part of this process a predictive model based on the existing data was developed to identify routes that traverse areas of low, medium, and high sensitivity in terms of possible impacts to cultural resources. Where small connector routes may be constructed, active reclamation is indicated, or changes in designations would alter the type and intensity of route uses, additional environmental compliance would be required.

A 100 foot buffer of each route is considered to be an area of direct impact, whereas the area beyond the 100 foot buffer is an area of indirect impact. Access to sites can present a range of potential impacts, including direct effects (e.g., artifacts and/or features eroding from road cuts; parking areas; vehicle pull-off/turnaround areas), indirect effects (e.g., collection and looting; inadvertent damage to sites, such as artifact scatters, resulting from off-road driving; visual, audible, and atmospheric effects that may diminish integrity of setting or feeling), and cumulative effects (e.g., increased road use causing sediment build-up on petroglyph panels; increased visitation to highly visible properties). Higher levels of human traffic may pose greater risks to cultural resources.

4.12.1. Alternative Comparison

Table 4.12-1 in Appendix B presents the linear miles of different route types that intersect a 100 foot buffer of identified cultural resources for each alternative. Table 4.12-2 in Appendix B presents the linear miles of different route types that intersect a 1/8-mile buffer of identified cultural resources for each alternative. Table 4.12-3 in Appendix B presents the number of cultural resources determined to be eligible for listing on the NRHP or treated as eligible[3] located within 100 feet of different route types for each alternative. Table 4.12-4 in Appendix B presents the number of cultural resources determined to be eligible for listing on the NRHP or treated as eligible located within a 1/8-mile of different route types by alternative. In addition, route miles through buffers of sites determined to be eligible for listing on the NRHP or treated as eligible are discussed. Table 4.12-5 in Appendix B presents the linear miles of different route types by alternatives that intersect areas of low, medium, and high probability for cultural resources based on a comprehensive predictive model. The model is currently being refined as part of a separate Section 106 compliance process and the current version of the model is considered to be a draft.

Under Alternative A, all existing routes would remain open and there would be no changes to existing route designations and conditions. Currently, approximately 204 miles of open routes pass within 100 feet of known cultural resources (Table 4.12-1, Appendix B). Of these open routes, 149 miles pass within 100 feet of the 199 sites either determined to be eligible for listing on the NRHP or treated as eligible (Table 4.12-3, Appendix B). Approximately 571 miles of open routes pass within 1/8 of a mile of known cultural resources, of which 131 are either determined to be eligible for listing on the NRHP or treated as eligible (Tables 4.12-2 and 4.12-4, Appendix B). Approximately 4,271.2 miles of open routes are located within medium probability areas for cultural resources; 791.3 within high probability areas, and 358.2 miles are located within low probability areas (Table 4.12-5, Appendix B).

Of the three action alternatives, Alternative B has the greatest lengths of closed routes and routes with limited access that would pass through the 100 foot or 1/8 mile buffer of identified cultural resources. Under alternative B, 72 miles of open routes would pass within 100 feet of the 74 sites either determined to be eligible for listing on the NRHP or treated as eligible. Approximately 1,586.7 miles of open routes in Alternative B pass within areas considered to have a medium or high probability for sites. Alternative C has a greater distance through the buffers of known cultural resource sites than Alternative B. Alternative C has approximately 107 miles of open routes passing within 100 feet of the 136 sites either determined to be eligible for listing on the NRHP or treated as eligible. Further, 3,044.2 miles of open routes in Alternative C are located within areas considered to have a medium or high probability for sites. Conversely, Alternative D, which prioritizes access to routes for recreation and travel, has the least distance of closed routes or routes with limited access that pass within the buffers of known cultural resources. Under Alternative D, 126 miles of open routes would pass within 100 feet of 177 sites either determined to be eligible for listing on the NRHP or treated as eligible. Approximately 4,114.4 miles of open routes in Alternative D are located within areas considered to have a medium or high probability for sites.

The lengths of routes that intersect the buffers of identified cultural resources presented in Tables 4.12-1 and 4.12-2 in Appendix B, as well as the number of cultural resources determined eligible or treated as

[3] Generally a site that is recommended as eligible or is undetermined is treated as eligible until the agency in consultation with SHPO determines otherwise.

eligible for inclusion in the NRHP presented in Tables 4.12-3 and 4.12-4 in Appendix B, suggest that the likelihood of direct and indirect impacts to known cultural resources is greatest for Alternative A. The results of the predictive model aid in predicting the likelihood of impacts to unknown cultural resources along the routes (Table 4.12-5, Appendix B). Each of the action alternatives would lessen adverse impacts to cultural resources in the project area compared to Alternative A. Of the action alternatives, impacts to cultural resources would likely be least for Alternative B and greatest for Alternative D. Impacts to cultural resources, including sites eligible for listing on the NRHP, resulting from Alternative C, which strives to balance public access and travel with resource protections, would fall between Alternatives B and D.

4.13. Native American Concerns

The KFO has initiated consultation with the relevant tribes and will continue to seek comments and advice regarding the potential effect of the road and trail network to be designated on areas and sites that may be of concern to Native Americans. As described in Section 3.13, the KFO has initiated Native American consultation with 10 tribes.

The various alternatives pose differing consequences to sites that typically are of concern to native peoples. Archaeological and historic sites that may be of concern to Native American tribes may include prehistoric and historic archaeological sites and historic sites or structures that are attributable to Native American culture or cultures. Sites of traditional religious and cultural importance in the BLM KFO that may be impacted by the four project alternatives may include trails, rock-art, and springs. This section focuses on a qualitative assessment of potential impacts to cultural resources including sites of traditional religious and cultural importance that the four alternatives may create.

4.13.1. Alternative Comparison

Thus far, Native American consultations have not led to the identification of any specific resources that would potentially be affected by the TMP. The data presented in Tables 4.13-1 and 4.13-2 in Appendix B show the number of prehistoric[4] sites within 100 feet and 1/8-mile of routes and may be used as a proxy measure of the potential impacts each of the four alternatives may have on cultural resources (including sites of traditional religious and cultural importance) that are of concern to Native American tribes.

Table 4.13-3 in Appendix B presents the route mileage within areas of low, medium, and high probability for prehistoric sites, based upon the results of the predictive model. This data helps to understand the potential impacts that each of the four alternatives may have on prehistoric sites that are currently unknown due to a lack of cultural resources survey coverage. The model is currently being produced and refined as part of a separate Section 106 compliance process and the current version of the model is considered to be a draft.

The data presented in Tables 4.13-1 and 4.13-2 in Appendix B suggest that the likelihood of direct and indirect impacts to cultural resources (including sites of traditional religious and cultural importance) that would be of concern to Native American tribes would likely be greatest for Alternative A. All of the action alternatives would lessen adverse impacts to cultural resources of Native American concern in the project area. Of the action alternatives, impacts to cultural resources of concern to tribes would likely be

[4] Also includes multi-component sites, which have both a prehistoric and historic temporal component.

least for Alternative B and greatest for Alternative D. Impacts to such cultural resources resulting from Alternative C, which strives to balance public access and travel with resource protections, would fall between Alternatives B and D. This conclusion is also supported by the data presented in Table 4.13-3 in Appendix B depicting route mileage within areas of low, medium, and high probability for prehistoric cultural resources.

Under Alternative A, impacts from motorized travel could occur to both known sites and sites that potentially could be of Native American concern that have yet to be identified. Potential direct effects (i.e., physical damage or destruction) to such sites from use of the road and trail network would include erosion of soil containing cultural materials or damage to or destruction of artifacts and features. Potential indirect effects could include vandalism or illegal artifact collection. This alternative would not have the beneficial impact of reducing OHV use in sensitive areas, as no routes would be closed to protect cultural resources or Native American concerns. Alternative B would offer the greatest benefit in regard to Native American concerns, as this alternative could provide additional resource protection for unrecorded sites of the type that are usually of concern to native peoples. Alternative B would decommission the highest number of routes that are impacting sensitive resources, which would be a beneficial impact. Alternative C would emphasize multiple-use by protecting sites of Native American concern while providing recreation and travel opportunities. Alternative C has a greater number of known prehistoric sites within 100 feet of open routes than Alternative B but less than Alternative D. Likewise, the mileage of open routes within Alternative C through areas of medium and high probability for prehistoric cultural resources is also larger than that of Alternative B but less than Alternative D. Alternative D contains the most known prehistoric sites within 100 feet of open routes, as well as the greatest mileage through areas of medium and high site probability amongst the three action alternatives.

4.14. Paleontological Resources

The project area contains PFYC Classes 1, 2, 3, and 4. These ratings show the potential for fossil yield as described in Section 3.14 and defined in Table 3.14-1. Proposed route designations by alternative located within a PFYC class within the project area are shown in Table 4.14-1. Generally, the more restrictive the alternative, the less impact on potential paleontological resources as a result of potential rutting from vehicle routes, accelerated erosion from routes which could expose or damage sites, and indirect impacts from visitation including collection and/or vandalism of paleontological sites.

The various alternatives pose differing consequences to PFYC Classes. More restrictive alternatives would lessen the effects on areas with moderate to high or low potential for paleontological resources as a result of more restrictive access. Less restrictive alternatives would likely keep OHV use at its current threshold and therefore be less adequate for enabling management of paleontological resources.

4.14.1. Alternative Comparison

Alternative A would designate all roads and trails “open” without regard to possible conflicts with paleontological resources. Management of existing routes would be left to future site specific project plans. No routes would be closed to protect paleontological resources. Under Alternative A, 1,149.36 miles of open or limited routes would intersect PFYC Class 3 or 4 areas where the potential for paleontological resources is moderate to high. A total of 2,548.32 miles of routes would intersect PFYC Class 1 or 2 areas where the potential for paleontological resources is low. Under this alternative,

paleontological sites would continue to be directly impacted by the ongoing use of existing routes (i.e., through erosion of vehicular routes). This alternative would be the least favorable for the preservation of paleontological resources due to the highest number of open or limited routes within PFYC Class 3 or 4 areas. Additionally, Alternative A would allow more access with the potential for unauthorized collecting.

Alternative B would provide additional resource protection. Under Alternative B, routes would be closed to protect sensitive biological, physical, and historical resource areas. Under Alternative B, 576.77 miles of routes would intersect PFYC Class 3 or 4 areas where the potential for paleontological resources is moderate to high. A total of 1,353.81 miles of routes would intersect PFYC Class 1 or 2 areas where the potential for paleontological resources is low. Seasonal closures would benefit paleontological resources by closing areas during the season with highest rainfall.

Under Alternative C, 802.13 miles of routes would intersect PFYC Class 3 or 4 areas where the potential for paleontological resources is moderate to high. A total of 1,887.17 miles of routes would intersect PFYC Class 1 or 2 areas where the potential for paleontological resources is low. The increase in route closures would benefit paleontological resources due to a reduction in access to potential sites likely resulting in a reduction in damage or unauthorized collection. Indirect impacts from visitation, collection, and/or vandalism would also be reduced. Overall, Alternative C would have lower impacts than Alternative A and D but more than Alternative B.

Alternative D would allow only basic protection of paleontological resources, as it would decommission the fewest miles of routes (169.09 miles) within PFYC Class 3 or 4 areas. Under Alternative D, 980.27 miles of routes would intersect PFYC Class 3 or 4 areas where the potential for paleontological resources is moderate to high. A total of 2,188.05 miles of routes would intersect PFYC Class 1 or 2 areas where the potential for paleontological resources is low. Impacts would be similar to those described for Alternative A, but slightly reduced.

4.15. Access and Transportation

Table 4.15-1 in Appendix B presents the total miles of open or limited and closed routes proposed under each alternative. Travel management designations would not affect BLM ROWs, permitted uses, county or State roads, or other valid existing rights. Restrictions apply only to motorized public access and recreational OHV use. Alternatives B, C, and D, would include signage of the network, monitoring of routes, and minor maintenance of routes to encourage users to stay on proposed designated routes. These measures would help limit route proliferation and provide a defined network and an improved opportunity for users to meet their desired experiences. Each action alternative would include minor route adjustments to avoid sensitive features. These minor realignments of the route network would be considered to be plan maintenance and in all cases the necessary clearances and environmental review would need to be conducted. Keeping roads open while closing redundant routes would benefit access and transportation by streamlining the transportation system within the project area. Some closures would create a need for the installation of gates, barricades, and other closure devices to reinforce the travel restrictions. Minor or major reclamation activities may occur on closed routes. Additional signage would also be needed to designate the allowable travel uses on the designated routes.

4.15.1. Alternative Comparison

Alternative A would not result in any route closures (Table 4.15-2, Appendix B). Use and travel by motorized and non-motorized vehicles would be allowed on all existing routes except where not currently permitted. Route proliferation would continue and there would be no change in existing access and uses. Figure 2.3-1 in Appendix E illustrates Alternative A. Alternative B is the most restrictive alternative as it relates to access, resulting in the closure of 2,718.50 miles of existing routes (Table 4.15-2, Appendix B). Access limited to administrative and authorized users, OHV width, seasonal use, or non-motorized use would total 1,065.23 miles. Approximately 1,708.75 miles of existing routes would remain open for public use. This alternative has the greatest amount of closures and restrictions on motorized travel and would therefore have the greatest impact on access and transportation. Alternative C would close 1,624.13 miles of routes. Access limited to administrative and authorized users, OHV width, seasonal use, or non-motorized use would total 553.81 miles. Approximately 3,315 miles of existing routes would remain open for public use. Alternative C balances resource management and the BLM's multiple-use mandate through providing a travel network that benefits a variety of resources while enhancing recreational access and transportation through improved signage, maintenance, monitoring, and planning. Implementation of Alternative D would result in the closure of 830.32 miles of existing routes (Table 4.15-2, Appendix B). Access limited to administrative and authorized users, OHV width, seasonal use, or non-motorized use would total 206.22 miles. Approximately 4,456 miles of existing routes would remain open for public use. Of the three action alternatives, Alternative D would have the least impact on the transportation system from the standpoint of closures.

4.16. Recreation

Access for all current recreational activities would continue in the project area, including non-motorized activities such as horseback riding, hiking; and other activities conducted on foot, such as hunting and game retrieval. The routes designated as closed under the action alternatives have adverse impacts on other resources, lack connectivity, and in many cases are already reclaiming. Seasonal closures would reduce access to some areas for recreational users throughout the KFO but have no impact on the SRMAs.

Table 4.15-2 in Appendix B compares the route designations in the alternatives. Alternatives B, C, and D would modify the network of routes for recreational activities, including minor realignments to avoid sensitive features and delineated recreational activities, resulting in an overall benefit to the recreational experience.

4.16.1. Alternative Comparison

Alternative A would not include implementation measures such as monitoring, mitigation, and signage, which could contribute to ongoing resource degradation. The highest mileage of routes would remain open throughout the project area (5,469.72 miles) and within the SRMAs (377.75 miles). Signage, maps, and active management would not be accomplished through this alternative potentially lessening the beneficial outcomes of individual recreational experiences.

Alternative B would close the highest number of routes throughout the project area (2,726.08 miles) and within the SRMAs (154.31 miles). As a result, Alternative B would have the lowest number of open routes (1,708.76 miles) of any of the alternatives and the highest level of adverse effect on motorized and

mechanized activities. Although some of the routes that would be closed consist of redundant routes, these closures would diminish opportunities for mechanized travel, concentrate users, and result in fewer opportunities for isolation on motorized routes. Within the SRMAs, users would be limited to 116.02 miles of routes. Users seeking non-motorized wildlife viewing or hunting opportunities may benefit from decreased levels of disturbances to wildlife. In addition, Alternative B would designate the greatest amount of non-motorized routes. Under this alternative, signage, maps, and active management of the route network would occur, potentially increasing the beneficial outcomes of individual recreational experiences.

Alternative C provides a balanced recreation system and access for the long-term sustainable management of recreation trails. Open routes (3,317.68 miles) are distributed throughout the project area and within the SRMAs (236.56) and provide a complete network of recreational opportunities, including recreational loops for motorized recreation. Routes designated for closure in the project area (1,630.75 miles) and within the SRMAs (87.36 miles) generally do not add to the recreational experience and primarily consist of redundant routes or routes with impacts to managed resources. Alternative C also creates 37.57 miles of limited width OHV routes (OHVs with less than a 50-inch wheel base), which benefits single track users. In addition, Alternative C would increase the amount of routes in the project area designated for non-motorized users from approximately 27 miles to nearly 53 miles. Under this alternative, signage, maps, and active management of the route network would occur, potentially increasing the beneficial outcomes of individual recreational experiences.

Alternative D leaves the highest number of routes open throughout the project area (4,464.00 miles) and within the SRMAs (293.58 miles) of the action alternatives and results in the least adverse impact to motorized activities. Alternative D also designates the greatest amount of limited width OHV routes and results in the highest level of benefit to single track users. This alternative would also designate a substantial amount of non-motorized routes (49.73 miles) in the project area, although somewhat less than Alternative C. Under this alternative, signage, maps, and active management of the route network would occur, potentially increasing the beneficial outcomes of individual recreational experiences.

4.17. Social and Economic Conditions

Alternatives B, C, and D would modify the network of routes available for recreational activities, including some minor realignments to avoid sensitive features and to increase the quality of the recreation experience, resulting in generally positive impacts to the socioeconomics as a result of enhanced recreational experiences. The purpose of the TMP is to provide a comprehensive and maintainable transportation system that balances resource protection and resource use.

4.17.1. Alternative Comparison

Under Alternative A, impacts to natural resources, over time, could impact the overall quality of the recreation and travel experiences and grazing operations. Unmanaged noise, dust, and increased use could be expected to impact local residents and users alike. Over time, as travel and recreation opportunities degrade, visitation and use may drop, resulting in reduced positive economic impacts to local economies, and negative impacts on the current social setting of the area of analysis, due to reductions in recreation and public land use related activities. The quality of the travel and recreational experience for both motorized and non-motorized users is likely to be improved with implementation of Alternatives B, C,

or D due to proposed monitoring and management of the route network. Implementation of one of these alternatives is anticipated to result in positive impacts to the local economy, including businesses such as guides, equipment dealerships and rental companies, lodging, and restaurants as a result of increased management. However, only a minor increase in visitation is anticipated under alternatives B, C, and D, which indicates that any increases in employment or economic activity within the project area would also be minor. It is possible that a more formal, stable, and organized route network would support the ability of local communities, interest groups, and user groups, to produce maps, guides, and other promotional materials that increase public awareness of the recreation opportunities within the project area. These effects, while positive, could be expected to result in only minor increases in visitation and associated tourism related expenditures.

4.18. Visual Resources

As described in Section 3.18, visual resources within the project area can be described in terms of the landscape's character, scenic quality, and visual sensitivity, i.e., the public's willingness to accept change within the visual environment.

Route proliferation (including parallel routes, multiple of routes going to the same destination, and routes that serve no known purpose) can negatively affect visual resources. The density and location of routes on the landscape also impact visual resources by creating contrasting elements of form, line and color. The amount of visual contrast can diminish over time as a result of reclamation efforts in areas where route proliferation is in high concentrations. Reducing contrasting elements and improving visual quality creates a more positive recreation experience for public land users by creating a more cohesive and appealing visual environment.

The total density of closed routes for each alternative with consideration given to maintaining access and providing for a positive viewer experience was evaluated. It is assumed that all open and limited route designations would have varying degree of use thus not allowing for reclamation. There would be regional beneficial affects to the visual resources by reducing the overall density of linear features on the landscape when compared to current conditions in areas of VRM, II and III, in areas of high or above average scenic quality (Class A and B) and areas of high sensitivity if visual values are a contributing factor. The types of adverse impacts and beneficial effects to visual resources would occur to differing degrees under all alternatives and are therefore common to all.

4.18.1. Alternative Comparison

Alternatives A through D would have different route lengths, densities and management constraints within the project area. In general, the greater the length and density of open routes, the greater the level of adverse impacts on visual resources. Alternative A would not close any routes. It would maintain the greatest distance of trails located within VRM Class I (2.06 miles) and open routes within VRM Class II (960.22 miles) and within areas of high to above average scenic quality (Class A and B) (3,884.08 miles). Alternative A would also maintain the greatest route distance within areas of high sensitivity (2,476.73 miles) as well as the greatest route density of the four alternatives evaluated. As a result, Alternative A would have the greatest level of visual contrast in form, line and color and the greatest adverse impacts to visual resources.

Alternative B would have the least mileage of trails located within VRM Class I (0.90 miles) and open routes within VRM Class II (317.09 miles), areas of high to above average scenic quality (Class A and B) (1,106.29 miles), and areas of high sensitivity (795.19 miles). Alternative B would have the lowest route density of the four alternatives and would decrease the level of visual contrast related to form, line and color within the project area. Overall, Alternative B would have the greatest beneficial impacts on visual resources. Beneficial impact would be the result of reclaimed and/or rehabilitated routes no longer contrasting the characteristic landscape.

Alternative C would have more miles of trails located within VRM Class I (1.46 miles) and open routes within VRM Class II (594.30 miles), areas of high to above average scenic quality (Class A and B) (2,328 miles) and areas of High sensitivity (1,503.64 miles) than Alternative B, but less than Alternatives A and D. Alternative C would result in beneficial impacts on visual resources as compared to Alternatives A and D while continuing to provide opportunities for public access through a more efficient route network. Beneficial impact would be the result of reclaimed and/or rehabilitated routes no longer contrasting the characteristic landscape.

Alternative D would have the greatest mileage of open routes and the greatest route density of the action alternatives. In addition, Alternative D would have more miles of trails located within VRM Class I (1.66 miles) and open routes within VRM Class II (762.62 miles), areas of high to above average scenic quality (Class A and B) (3,140.99 miles) and areas of high sensitivity (1,976.62 miles) than Alternatives B and C, but less than Alternative A. Therefore, Alternative D would have the highest level of adverse impacts on visual resources than any of the action alternatives. Beneficial impact would be the result of reclaimed and/or rehabilitated routes no longer contrasting the characteristic landscape.

5 Cumulative Effects Analysis

5.1. Introduction

Cumulative effects are the direct and indirect incremental effects of the impacts from implementing the proposed changes and projects in each of the alternatives, when added to other past, present, and reasonably foreseeable actions (40 CFR Part 1508.7). Past activities are those activities whose effects are still present on the landscape. Future activities are those reasonably foreseeable actions that may add to the cumulative effects on the environment and social impacts.

5.1.1. Physical and Temporal Boundaries of Cumulative Impacts

Cumulative impacts are most likely to occur when a relationship exists between a proposed alternative and other actions that have, or are expected to occur in a similar location, time period, or involve similar actions. The geographic boundary of the cumulative impact analysis area (CIAA) encompasses the KFO. The KFO boundary was used to identify past, present, and reasonably foreseeable future actions (RFFA) that may have a cumulative impact when considered with the TMP.

5.1.2. Past, Present and Reasonably Foreseeable Future Actions

Currently, the KFO has approximately 22 applications to grant ROWs for the construction and maintenance of approximately 4.75 miles of new roads as well as for the improvement and maintenance of approximately 39 miles of existing roads on public lands. Additionally, two applications for

transmission lines have been submitted which, if granted, would result in approximately 7 miles of new roads and the improvement and maintenance of approximately 7 to 12 miles of existing roads on public lands, depending on the alternatives selected. Although granting ROWs is a discretionary action on the part of the BLM, in most cases applications for ROWs result in an approval. Therefore, it is likely that a substantial amount of these applications would result in new roads being constructed and improvements and maintenance to existing roads on public lands. Given the amount of private lands intermingled within public lands and the projected population growth in the region, it is anticipated that applications would continue to be received well into the foreseeable future, thereby increasing the amount of new roads as well as improvement and maintenance projects to existing roads on public lands. Many of the proposed ROWs would affect adjacent lands by partially or wholly providing the access and infrastructure necessary for their development, however it would be too speculative to provide an estimate of the amount of these lands which would result in being developed. Site-specific NEPA analysis would be conducted for these actions as applicable, including analysis of impacts to travel management and route designations.

Since Fiscal Year (FY) 2014, the KFO has averaged approximately six mining notices every FY. These notices can lead to the construction of temporary routes as defined in Section 3.4 of Appendix C. Temporary routes are required to be reclaimed upon completion of mining activities. Acreage of disturbance could not reasonably be estimated as the area of disturbance (1/10 of an acre to 5 acres) can vary greatly depending upon the mining notice. In all cases, reclamation is required for all disturbance (i.e., temporary route construction) associated with mining notices. It is reasonable that the KFO would continue to receive a similar amount of new mining notices annually resulting in a reoccurring need to construct temporary routes.

Currently, the KFO has 99 applications on file for maintenance of existing or installation of new range improvements. Of the 99 applications, 61 are for the maintenance of existing range improvements while 38 are for the installation of new range improvements. As these applications have not been evaluated by the KFO, it is unknown at this point how many applications are along existing routes and how many applications would involve the construction of new routes. Although, it is assumed that at least 61 of the applications are along existing routes as they involve maintenance of existing facilities. It would be assumed that new route development or maintenance of existing routes would occur in association with the granting of these permits and therefore promote access and potentially add routes to the project area as time progresses. A determination as to the type of route designation for these access routes leading to range improvements would be made on a case-by-case basis and evaluated in site-specific NEPA analysis, as appropriate.

5.1.3. Cumulative Effects

The following analyses consider the CIAA and past, present, and reasonably foreseeable actions that may cumulatively contribute to impacts for each resource. The designation of routes as “closed” allows for rehabilitation of surface disturbances; therefore, in all Action Alternatives, the TMP would result in an incremental reduction in the disturbance to soils, wildlife, vegetation, and water resources as compared to Alternative A project area-wide.

5.2. Air Quality

The air quality in the area is affected by travel on local highways and roads, OHV use for recreational activities, a limited number of industrial facilities in Mohave County, and naturally occurring wind events and dust storms. These activities do not typically degrade the ambient air quality in the area. Dust storms occurring during the monsoon season in the desert may result in temporary, localized exceedances of the NAAQS for PM. In the areas surrounding the KFO, on-road vehicle use is expected to continue at current or increased levels. Dust concerns are expected to occur throughout the route network and grow proportionately parallel with and as population and visitor numbers expand. Under all action alternatives, no long-term cumulative impacts are expected.

5.3. Soils and Surface Water Quality

The majority of the soils within the KFO are erodible by wind and water, and vegetation cover is intermittently sparse because of aridity. Similar to soil resources, a reliable indicator of potential cumulative impacts to surface water and water quality throughout the project area is proportional surface disturbance and loss of vegetation cover, particularly in existing impaired watersheds which would contribute to erosion and sedimentation. Past and existing actions that affect soil compaction, stability, and quality include livestock grazing, mineral development, ROWs for roads, and recreational off-highway use. These same past and present activities have also impacted watersheds leading to sedimentation to waterbodies within the KFO.

Cumulative impacts associated with Alternatives B, C, and D would be similar. Each of the alternatives would close routes that are redundant or dead end spurs that serve no purpose. Alternative D would have slightly higher cumulative impacts than Alternatives B or C due to having more open routes than the other alternatives.

RFFAs within the KFO include construction and maintenance of new roads, improvement and maintenance of approximately 39 miles of existing roads on public lands, 2 proposed transmission lines, expected yearly mining notices, and maintenance of range improvements. During construction of new roads, transmission lines, range improvements and development associated with mineral exploration soil would be disturbed and soil compaction would increase. Vegetation would be cleared which would decrease soil cover and increase erosion and sedimentation to waterbodies. The BLM has BMPs and stipulations that would reduce the impacts to perennial waterbodies from RFFAs. The TMP alternatives would contribute very little cumulatively, if not reduce these impacts.

5.4. Vegetation and Special Status Plants

Past and present activities such as livestock grazing, mineral development, ROWs for roads, and recreational off-highway use have impacted the vegetative cover within the KFO. Where public lands are grazed, riparian areas and areas around water sources generally see an increase in invasive weeds and a decrease in vegetative cover unless they are actively managed.

Cumulative impacts associated with Alternatives B, C, and D would be similar. Each of the alternatives would close routes that are redundant or dead end spurs that serve no purpose. Alternative D would have slightly higher cumulative impacts than Alternatives B or C due to having more open routes than the other

alternatives. Impacts would generally be reduced from current conditions as redundant and spur routes are closed through the travel management planning process.

RFFAs within the KFO include construction and maintenance of new roads, improvement and maintenance of approximately 39 miles of existing roads on public lands, 2 proposed transmission lines, expected yearly mining notices, and maintenance of range improvements. During construction vegetation would be cleared, cut, or trampled. The BLM has BMPs and stipulations that would reduce the impacts to vegetation from RFFAs. The TMP alternatives would contribute very little cumulatively, if not reduce these impacts.

5.5. Wildlife and Special Status Species

This cumulative effects analysis applies to all wildlife species that occur within the project area. Past and present actions such as livestock grazing and the current transportation network in the area have fragmented and degraded wildlife habitat within the KFO.

RFFAs such as transmission lines, new roads, yearly mining notices, and maintenance of range improvements would continue to contribute cumulative impacts to wildlife species and habitat through vegetation removal. Habitat fragmentation would continue and increase accordingly. RFFAs would decrease grazing, browsing, and foraging habitat and increase the potential for mortality from motor vehicle strikes. However, designation of a route system under any of the action alternatives, as well as other BLM travel management planning in the CIAA would reduce the existing levels of disturbance and habitat fragmentation to wildlife by closing or limiting route use and restoring previous disturbance. Management of designated routes would improve habitat quality by maintaining proper trail width and reducing impacts to vegetation.

Seasonal closures of routes under Alternatives B, C, and D would benefit wildlife throughout the area. Habitat loss, degradation, and fragmentation would be decreased when routes are closed or use is limited. Decreased human disturbance especially during the breeding season would enhance breeding success and survival of young. The closures of routes that cross or are in close proximity to waterways would decrease potential impacts to riparian and fish habitat caused by motorized vehicles, including sedimentation, turbidity, and bank disturbance.

5.6. Cultural Resources, Native American Concerns

Past, current, and future use of the KFO for recreation, ranching, hunting, and vegetation management have a minor impact on cultural resources within the CIAA. In the past, the main impacts to cultural resources were due to route proliferation. Implementing the proposed TMP should reduce route proliferation. All other RFFAs would require cultural inventories and any anticipated impacts would be reviewed at that time. Implementation of the proposed TMP or its action alternatives would contribute very little cumulatively, if not reduce these impacts.

5.7. Paleontological Resources

Disturbances within high yield fossil areas likely would result in some irreversible loss of fossil material. It is anticipated that any disturbance that would cross high yield fossil areas would incrementally reduce the quantity of near-surface fossil resources as more of the ground surface is disturbed. The quantities of

fossils recovered and contributed to scientific collections also would incrementally increase. The risk of unauthorized collection of fossils would be increased by improved access and more bedrock exposure from construction activities. The BLM has BMPs and stipulations that would reduce the impacts to paleontological resources from RFFAs. The TMP alternatives would contribute very little cumulatively, if not reduce these impacts.

5.8. Access and Transportation

Past, present, and RFFAs that may be an impact to the transportation network would include new road construction, proposed transmission lines, yearly mining notices, and maintenance of range improvements, which would increase the use of routes and create new routes within the KFO. In general, new routes created for transmission lines and would be temporary routes or limited to authorized users and closed and decommissioned after the project is complete. Similarly, temporary routes may be created for livestock grazing management and would be subject to the grazing permit requirements. Cumulative impacts to access and transportation are expected to be minor.

5.9. Recreation

Past, present, and reasonably foreseeable future actions such as new road construction and transmission lines within the KFO would change the landscape characteristics, existing conditions on area transportation systems, and existing topography, and potential for wildlife viewing, which would contribute to an overall change in the social values for recreation users. In general the TMP alternatives would enhance the recreation experience, depending on the recreational use, and when added with other cumulative impacts would not result in any adverse cumulative impacts.

5.10. Social and Economic Conditions

Past and present actions for socioeconomics are the same as described above for recreation. The types of cumulative impacts to socioeconomics would be the same as described above for recreation. With route closures, OHV use would be concentrated into certain areas within the KFO where more emphasis can be placed on improving routes and user experience. In addition, concentrating OHV use in areas could increase non-motorized opportunities, and the quality of the experiences for these users may be improved.

5.11. Visual Resources

The TMP alternatives would not result in any adverse cumulative impacts to visual resources when considered with the RFFAs, since there would be no net increase in total route miles in all VRM classifications within the KFO and there would be no increase in route density under any alternatives. The motorized and non-motorized trails analyzed under the action alternatives are currently meeting VRM management objectives, resulting in weak contrasts and direct impacts to the characteristic visual landscape, and when added with other visually impacting actions, would not result in any measurable cumulative impacts.

6 Consultation & Coordination

6.1. Tribes, Individuals, and Agencies Consulted

The following tribes, agencies, organizations, businesses and individuals were consulted with or participated during the scoping process.

6.1.1. Tribes

Chemehuevi Indian Tribe	Colorado River Indian Tribes	Fort Mojave Indian Tribe	Fort McDowell Yavapai Nation	The Hopi Tribe
Hualapai Tribe	Navajo Nation	Salt River Pima-Maricopa Indian Community	Yavapai-Apache Nation	Yavapai-Prescott Indian Tribe

6.1.2. Federal, State, and Local Agencies

BLM's Resource Advisory Council	Arizona Department of Transportation	La Paz County
U.S Army Corps of Engineers	AZGFD	Mohave County
U.S. Bureau of Reclamation	Arizona SHPO	Yavapai County
USFWS	Arizona State Lands Department	City of Kingman
	AZ SP	

6.1.3. Individuals, Businesses, and Organizations

William French	Terry L. Atchley	Jim Royals	Wayne Hinrichsen
Carol Mogeno	Tony Campbell	Gary Sims	Suzanne Glennon
Don and Joy Lafrentz	Jim Pauoanport	Don Easton	Joan Beck
Jack Krumbholz	Becky Shuttz	Deddie Easton	John Savion
Rebecca Antle	Jim Hills	Ron and "C" Russell	Hal Barton
Loriette Krumbholz	Craig Elliot	Valerie Tauennes	Jerry Kohler
April A Drane	Kate Grosch	Sarah Schurman	Buz Terry
John Strong	Rocky Grosch	Ed Huskinson	K. Broadie
Darryld Kautzmann	Kid Johnson	Celeste Irons	Cal Mortensen
Jim Bowen	Donna Johnson	Ryan Ackerman	Bob Seibert
Wayne Hollins	Mike Barren	Ted and Dawn	Phil
Jim Brightly	Craig Holder	Palfreyman	Craig Mintonye
Sabrine Brightly	Miloe Kitchen	Mickey Rogers	Edward S Moony Sr
John Saruwatari	Chuck and Pam Steffen	Luis Vega	Carol Bosmon
Goden & Bea Marrs	Trish Carter	Allen Kuns	Rodney Lumpkin
Kenny Statler	Ruta and Fat Fox	Ed Mann	Marge Penton
Joesph O'Lszewski	Mike and Bev	San Stalin	Neal Ayres
Londa O'Lszewski	Schoenfuss	Connie Bosorquez	Lee Bundy
Jim Johnson	Karen Strain	Diana and Charlie	John Geyer
Brad Morrison	Stephen Strain	Pipher	Lisa Ferrell
Chris Mousky	Rick Henderson	Carol Henerdson	
Mark Waskosky	Jeremy Palmer	Ed Mooney Jr	
Eric Spurr	Bill Wilson	Andrea Mooney	

7 List of Preparers/Reviewers

The table below shows all BLM staff and Logan Simpson staff that were involved and participated in scoping, route evaluation, and preparation of the TMP and EA. Some of the individuals listed in each table no longer work in those positions; titles listed are the individual's position at the time of their involvement as noted.

Name	Organization	Role
Amanda Dodson	BLM (KFO)	Field Manager
William Gibson	BLM (ASO)	TMP State Lead
Nancy Favour	BLM (ASO)	Planning and Environmental Coordinator
Matthew Driscoll	BLM (KFO)	Outdoor Recreation Planner
Trevor Buhr	BLM (KFO)	Assistant Field Manager
Chris Bryan	BLM (KFO)	Assistant Field Manager
Rebecca Peck	BLM (KFO)	Wildlife Biologist
Angelica Rose	BLM (CRD)	Planning and Environmental Coordinator
Andy Whitefield	BLM (KFO)	Environmental Protection Specialist
Joelle Acton	BLM (KFO)	Rangeland Management Specialist/Acting Wildlife Biologist
Celeste Mimnaugh	BLM (KFO)	Realty Specialist
Kerry Gaiz	BLM (CRD)	GIS
Caroline Kilbane	BLM (LHFO)	Outdoor Recreation Planner
Mike Blanton	BLM (KFO)	Rangeland Management Specialist
Shane Rumsey	BLM (KFO)	Archeologist
Bruce Meighen	Logan Simpson	Contract Manager
Tom Keith	Logan Simpson	Senior NEPA Specialist
Terra Mascarenas	Logan Simpson	Senior Environmental Planner
Brian Taylor	Logan Simpson	GIS
Chris Bockey	Logan Simpson	Visual Resources Specialist
Erin Bibeau	Logan Simpson	Project Manager/Senior Environmental Planner
Kristina Kachur	Logan Simpson	Environmental Planner
Kay Nicholson	Logan Simpson	Senior Biologist
Julie Capp	Logan Simpson	Environmental Planner/Biologist
Holly Ayala	Logan Simpson	Environmental Planner
Elizabeth Sharkey	Logan Simpson	Archaeologist

Notes: ASO=Arizona State Office; CRD=Colorado River District; LHFO=Lake Havasu Field Office