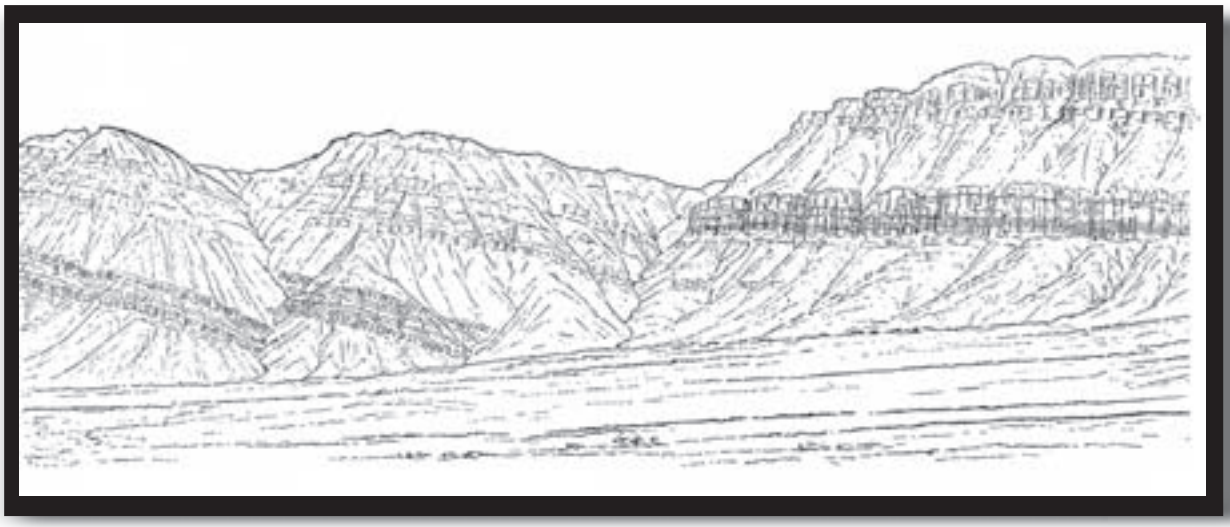
Chapter 4
Environmental Impacts



"Something's gotta happen to keep it the same."

Kelly Heaton, 2002

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CHAPTER 4. ENVIRONMENTAL IMPACTS

INTRODUCTION

This chapter describes the environmental consequences of implementing any of the five planning alternatives described in Chapter 2, including the No Action Alternative and the Proposed Plan. It examines the potential impacts of the decisions that would be made under each resource program on each of the impact topics (i.e., resources, resource uses, special management areas, and social and economic conditions) described in Chapter 3. Impacts were analyzed with the mitigation measures outlined in Chapter 2 (within the alternative decision tables) in place. Any additional mitigation measures that could reduce or prevent major adverse impacts identified during the impact analysis are also identified in this chapter and in the appendices. A tabular summary of impacts can be found at the end of Chapter 2 (Table 2.19).

ANALYTICAL ASSUMPTIONS AND GUIDELINES

This document assesses the actions proposed for managing Parashant, Vermilion, and the Arizona Strip FO and includes direction from legislation and the Monument proclamations. It also includes direction from legislation creating Lake Mead National Recreation Area (NRA) and Glen Canyon NRA. The analysis is bounded by decisions identified in the proclamations or legislation and does not include alternatives to these decisions. These decisions are as follows:

- Certain uses would be restricted or limited by the proclamations, legislation, federal regulations, or agency policy.
- Ongoing reasonable access to state and private land or interests would be provided.
- Grazing, where currently permitted, would continue.
- Hunting and fishing would be regulated by the State of Arizona, with the exception that the Secretary of the Interior, in consultation with the state, may take certain steps to regulate hunting in the Planning Area for reasons such as public safety and protection of resources.
- Decisions relating to land areas included in eight congressionally designated wilderness areas on Bureau of Land Management-administered public lands (BLM lands) and recommended areas for proposed wilderness on National Park Service-administered lands (NPS lands) would be upheld.
- Decisions relating to the proposed wild and scenic river designations for the Paria and Virgin rivers (BLM 1994) would be upheld.
- Old Spanish National Historic Trail (NHT) Congressional Designation (2002) would be recognized and decisions relating to the designation upheld.

The following general assumptions and guidelines were used to guide and direct the analysis of environmental impacts. Other assumptions specific to a particular impact topic are presented under that topic:

- The BLM and NPS would have sufficient funding and personnel to implement any of the alternatives as described in Chapter 2.
- Research would continue, dependent upon sufficient funding.
- Management of the Arizona Strip District including the Monuments would be consistent with existing laws, regulations, policies, and guidelines.
- The planning period for the analysis is the next 15 to 20 years.
- Recreation use in the Planning Area would continue to increase.
- Livestock grazing would continue to be governed by applicable laws and regulations.
- Specific actions to protect human life would be taken regardless of the management criteria in the plan alternatives.
- The discussion of impacts is based on the best available data. Knowledge of the Planning Area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used to infer environmental impacts where data is limited.

INCOMPLETE OR UNAVAILABLE INFORMATION

As mandated by 43 Code of Federal Regulations (CFR) 1502.22, agencies evaluating reasonably foreseeable significant adverse effects on the human environment in an EIS must identify incomplete or unavailable information, if that information is essential to a reasoned choice among alternatives. This Proposed Plan/FEIS is based on the best available data for each impact topic. However, there are few detailed resource surveys and inventories for the Planning Area, limiting the amount of available data necessary for in-depth impact analysis. For example, most of the Planning Area has not been surveyed for cultural or paleontological resources, while water quality and visitor use information is very limited. In absence of such data, best professional judgment of BLM and NPS resource specialists and staff working in the Planning Area was used in the impact analysis.

TYPES OF IMPACTS

This chapter describes the direct, indirect, and cumulative impact of implementing the No Action Alternative and each of the four action alternatives. Direct impacts are caused by an action and occur at the same time and place as the action. Indirect impacts are caused by the action and occur later or farther away but are still reasonably foreseeable. Cumulative impacts are the effects on the environment that result from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. Cumulative impacts are briefly described at the end of the analysis for most impact topics, while a more detailed discussion is provided at the end of this chapter.

Impacts are also described as to their context, intensity, and duration. Context generally refers to the geographic extent of impact (localized or widespread). Impact intensity is the magnitude or degree to which a resource would be beneficially or adversely affected. The criteria that were

used to rate the intensity of the impact for each impact topic is presented later in this section under each impact topic heading. Impact duration refers to how long an impact would last. For the purposes of this Proposed Plan/FEIS, the planning team considered impacts as either short term or long term to describe the duration of the impacts. Unless otherwise stated for any particular impact topic, short-term impacts would occur within five years of implementing the Plan, often during construction and recovery, while long-term impacts would occur outside this five-year timeframe.

NPS Impairment of Resources

In addition to determining the environmental consequences of the alternatives, NPS policy (NPS 2001: Management Policies, Section 1.4) requires that potential effects be analyzed to determine if a proposed action would impair the resources or values of the NPS unit, "including the opportunities that otherwise would be present for the enjoyment of those resources or values."

Impairment analysis is required only for the NPS portion of Parashant. While the BLM is mandated by proclamation to protect the Monument objects, and thus avoid any adverse impacts that would otherwise "impair" such objects, the agency is not required to conduct impairment analysis. Consequently, a determination about impairment is made for the NPS portion of Parashant only. This impairment determination can be found in the conclusion of this chapter. A description of the impairment analysis legal framework and linkage to the National Environmental Policy Act (NEPA) is outlined in Appendix 4.C.

The fundamental purpose of the NPS, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve resources and values. NPS managers always must seek ways to avoid or minimize adverse impacts on the resources and values to the greatest degree practicable. However, the laws do give the NPS the management discretion to allow impacts on the resources and values when necessary and appropriate to fulfill the purposes of a unit (in this case, a National Monument), as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS this management discretion, that discretion is limited by the statutory requirement that the NPS must leave the resources and values unimpaired unless a particular law directly and specifically provides otherwise.

The impairment prohibited by the Organic Act and the General Authorities Act is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impacts; the direct and indirect effects of the impacts; and the cumulative effects of the impact in question and other impacts.

An impact on any resource or value may constitute an impairment. An impact would be most likely to constitute an impairment if it affects a resource or value whose conservation is:

a) Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the Monument,
b) The key to the natural or cultural integrity of the Monument or to opportunities for enjoyment of the Monument, or
c) Identified as a goal in the Monument's general management plan or other relevant NPS planning documents. An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated, or an action necessary to preserve or restore the integrity of Monument's resources or values.

Impairment may occur from visitor activities, NPS activities in the course of managing a park, or activities undertaken by permittees, contractors, or others operating in the park as well as from external actions. Impairment can occur from inaction as well as action. For example, failure to prevent the spread of seriously disruptive invasive species may impair park resources.

BLM AND NPS MANDATORY TOPICS

The BLM's NEPA Handbook (H-1790-1) and NPS Director's Order #2 (Park Planning) require that all EISs address certain topics, which the BLM refers to as Critical Elements of the Human Environment. The list of elements contained in the BLM handbook has been expanded by BLM Instruction Memoranda and Executive Orders. Further clarification of the required topics that need to be addressed is provided in the BLM Land Use Planning Handbook (BLM 2005). These impact topics are presented in Table 4.1 in the order they appear in Chapters 2, 3, and 4, followed by corresponding Critical Elements of the Human Environment and NPS mandatory topics.

Table 4.1: Mandatory EIS Topics

Topics Addressed in this Proposed Plan/FEIS (BLM Land Use Plan Handbook)	Critical Elements of the Human Environment (BLM NEPA Handbook)	NPS Mandatory Topic (Park Planning)
Resources		
Air	Air Quality	--
Water (includes water rights, surface water, ground water)	Water Quality, Drinking or Ground	--
Soils	--	--
Geology and Paleontology (including cave and karst resources)	--	--
Vegetation	Invasive, Nonnative Species; Wetlands/Riparian Zones	Wetlands and floodplains
Fire and Fuels Management	--	--
Fish and Wildlife	--	--

Table 4.1: Mandatory EIS Topics

Topics Addressed in this Proposed Plan/FEIS (BLM Land Use Plan Handbook)	Critical Elements of the Human Environment (BLM NEPA Handbook)	NPS Mandatory Topic (Park Planning)
Special Status Species (includes both animals and plants)	Threatened or Endangered Species	Endangered or threatened plants and animals and their habitats (including those proposed for listing on other state lists)
Wild Burros	--	--
Cultural Resources (includes archaeological and historical and resources of traditional importance to American Indians)	American Indian Religious Concerns; Cultural Resources	Urban quality, historic and cultural resources, and design of the built environment; Important scientific, archeological, and other cultural resources including historic properties listed or eligible for the National Register of Historic Places (NRHP); American Indian sacred sites
Visual Resources (including night sky)	--	--
Soundscapes	--	--
Wilderness Characteristics	--	Ecologically critical areas, wild and scenic rivers or other unique natural resources
Resource Uses		
Vegetation Products		
Lands and Realty	Energy, including renewable	Energy Requirements and conservation potential
Livestock Grazing	--	--
Minerals	--	--
Recreation and Visitor Services/Interpretation and Environmental Education	--	--
Travel Management	--	--
Special Designations		
Congressional Designations (includes designated and NPS-proposed wilderness and wild and scenic rivers)	Wilderness; Wild and Scenic Rivers	Ecologically critical areas, wild and scenic rivers or other unique natural resources
Administrative Designations (includes Areas of Critical Environmental Concern (ACECs))	ACECs	Ecologically critical areas, wild and scenic rivers or other unique natural resources
Social and Economic Conditions		
Socioeconomics		
Environmental Justice	Environmental Justice	Socially or economically disadvantaged populations
Health and Safety (includes abandoned mines and hazardous materials)	Wastes, Hazardous or Solid	Public health and safety

Table 4.2 lists mandatory BLM and NPS that are not discussed further in this Proposed Plan/FEIS because they do not occur within the Planning Area or, if they occur, would not be affected by the management direction being analyzed (see 40 CFR 1500.4).

Table 4.2: Topics Not Discussed in this Proposed Plan/FEIS

BLM Mandatory Topics	NPS Mandatory Topics	Reason for Omission
Farm Lands, Prime or Unique	Prime and unique agricultural lands	No prime or unique farm or agricultural lands occur in the Planning Area
Floodplains	Floodplains	No projects or activities are proposed that would result in diversions in or placement of permanent facilities on active floodplains of major rivers. No 100 or 500-year floodplains of major rivers occur in the NPS portion of the Planning Area
Indian Trust Resources	Indian Trust Resources	No Indian trust resources would be impacted.

IMPACTS TO RESOURCES

AIR

Impacts to air quality come primarily from sources outside the Planning Area, such as regional haze, and are thus outside the scope of this Proposed Plan/FEIS. However, short-term air quality effects could result from fugitive dust and smoke that both directly and indirectly relate to proposed management actions. Main sources of fugitive dust include vehicle and equipment use on unpaved roads, road construction and maintenance activities, and mineral operations. Main sources of smoke arise from wildland and prescribed fires.

Methods and Assumptions

The analysis of potential impacts to air quality is based on the expertise of BLM resource specialists at the Arizona Strip FO and the NPS staff at Lake Mead NRA. Combined, these specialists and staff possess an extensive knowledge of air quality within the Planning Area. The impact analysis is also based on review of existing literature and information provided by non-planning team experts in the BLM, NPS, and other agencies.

Quantifying air quality effects is difficult due to the lack of air quality monitoring data for the Planning Area. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: No changes to air quality would occur, or changes in air quality would be below or at the level of detection. If detected, the effects would be considered slight.

Minor: Changes to air quality would be measurable, although the changes would be small, short-term (less than seven consecutive days), and local. Mitigation measures would not be necessary.

Moderate: Changes in air quality would be measurable and would have appreciable consequences, although the effect would be relatively local. Air quality mitigating measures would be necessary, and they probably would be successful.

Major: Changes in air quality would be measurable, have substantial consequences, and be noticed regionally. Air quality mitigating measures would be necessary, and their success would be uncertain.

Impacts to Air

Impacts to air quality in Parashant would result from actions proposed under the following resource management programs:

- Travel Management
- Vegetation and Fire and Fuels Management
- Soil, Air, and Water
- Special Status Species (Parashant and Arizona Strip FO)
- Minerals (Arizona Strip FO only)
- Recreation
- Livestock Grazing

Alternative A: No Action

Impacts from Travel Management

Since off-road vehicle use contributes considerably to air impairments from fugitive dust, not authorizing any areas of the Monuments for cross-country, off-road vehicle use, except for authorized administrative and emergency purposes, and limiting travel on designated roads and trails would limit impacts to air quality. Fugitive dust would be minimal or nonexistent on 285,268 acres in Parashant, 89,828 acres in Vermilion, and 123,100 acres in the Arizona Strip FO closed to motorized and mechanized vehicle use, although some dust could blow in from adjacent roads along the boundaries of such areas.

The public would have access to 1,715 miles of unpaved roads in Parashant and 446 miles in Vermilion. Use of these roads would continue to create localized air pollution in the form of light fugitive dust, especially in the lowest and driest part of Parashant, such as Pakoon Basin.

However, sandy soils in most of Vermilion have a low potential for producing fugitive dust and, in addition, keep vehicle speeds down, further reducing the levels of dust. Additional miles of roads in Parashant and in Vermilion would be open to administrative use only, which would contribute minimally to air quality impacts due to their expected relatively light use. Road maintenance activities, although minimal and designed solely to correct those conditions that are unsafe or hazardous, would also result in fugitive dust. Watering and the use of chemical dust suppressants would greatly reduce the amount of dust emissions from airstrips and problem roads. Closing and rehabilitating 71 miles of roads in Parashant and 105 miles in Vermilion, as well as some additional roads where no public or administrative need exists, would result in reduced amount of fugitive dust within the immediate vicinity of the closed roads. The construction of no new motorized routes and would help maintain the current low level of impact from travel on roads into the future. Overall impacts to air quality from travel on unpaved roads and road maintenance/ improvement activities would be localized and short-term, and could be rated from negligible to minor.

In the Arizona Strip FO under Alternative A, motor vehicles would be limited to designated roads and trails on 282,019 acres of BLM lands and limited to existing routes on 1,575,140 acres of BLM lands. Since the vast majority of roads and trails in the Arizona Strip FO are not paved, use of these roads would result in fugitive dust. In addition, 803 acres of public lands would be open to motorized and mechanized vehicle use and an OHV event area would be designated under Alternative A. Vehicle use, specifically OHV use, in open areas and OHV "play" areas compared to designated and existing roads has the potential to cause the greatest amount of direct impacts to air quality in terms of fugitive dust. When combined, these impacts would be negligible to minor, depending upon the level of use, speed of vehicle, and climatic conditions (e.g., amount of wind, humidity, and soil moisture). Road maintenance activities, which would be limited to existing route types, maintenance levels, and frequencies, would also result in fugitive dust. Watering and the use of chemical dust suppressants would greatly reduce the amount of dust emissions from maintenance and on haul roads from gravel pits, mines, and oil drilling sites.

Impacts from Vegetation and Fire and Fuels Management

The treatment efforts aimed at reducing fuel loads under Alternative A in Parashant and the Arizona Strip FO would decrease the chance of catastrophic fire. No maximum acreage limits would be set. Some of the treatments methods proposed (e.g., mechanical and chemical) would result in localized and short-term impacts to air quality, including fugitive dust, emission/exhaust from equipment, and chemical fumes. The use of naturally ignited wildland fire and prescribed fire would result in smoke emissions in the immediate area. In general, these impacts would be minor, although moderate intensity impacts could be experienced in the immediate vicinity of the treatment areas. The effects on air quality from wildland fires would potentially be of longer duration than planned ignitions, depending on the vegetation types involved. Catastrophic fires, however, would result in greater, direct impacts resulting from smoke and fire abatement efforts. Indirect impacts from catastrophic fires could stem from reduced or eliminated vegetation cover,

exposing the underlying soil to wind and water erosion, which would in turn increase levels of fugitive dust during wind events. Thus, while treatment efforts to reduce fuel loads would result in some direct but minor impacts to air quality, decreasing the potential of hazardous effects of unplanned wildfire would result in positive, indirect impacts to air quality that would be more widespread and longer term.

Because of the sparse vegetation and low productivity potential in Vermilion, no or minimal vegetation management is proposed under the alternatives. In addition, wildfires tend to be confined to singletree events in Vermilion. As a result, there would be no or negligible impacts to air quality from Vegetation and Fire and Fuels Management in Vermilion.

Impacts from Soil, Air, and Water

Application of specific mitigation measures identified in activity level planning and NEPA level review would prevent or reduce impacts to air quality. In Parashant, mitigation during surface disturbing projects would reduce or eliminate the potential for fugitive dust.

Impacts from Special Status Species

The Pakoon Basin in Parashant is one of the lowest and driest parts of the Monument and thus more susceptible to fugitive dust. The ban on competitive speed events and restriction of non-speed events to designated roads within the Pakoon Desert Wildlife Management Area (DWMA) would prevent large amounts of fugitive dust in this area. Limits on driving speed, construction, maintenance, and use of roads within the Pakoon DWMA would also result in reduced fugitive dust in the Pakoon Basin. These impacts would be minor.

The proposed restrictions on road use, construction, and maintenance activities, fire and fuels treatments, and non-speed competitive events, and the ban on competitive speed events within the desert tortoise ACECs in the Arizona Strip FO would reduce the amount of fugitive dust within the vicinity of the ACECs. This impact would be minor.

Impacts from Minerals (Arizona Strip FO only)

Minerals exploration, development, construction, and operations could increase heavy and light vehicle traffic on paved and unpaved roads in the Arizona Strip FO, which would contribute to fugitive dust. Surface disturbing activities such as excavation, digging, and grading would increase the amount of fugitive dust. Adherence to best management practices outlined in mining laws, plans of operation, pertinent restrictions, standard terms and conditions, etc., would help minimize such impacts. Closing 80,766 acres of the Arizona Strip FO to fluids mineral leasing, withdrawing 100,896 acres to mining location, and closing 210,748 acres to mineral material disposal would virtually eliminate fugitive dust from mineral management within those areas. Overall impacts to air quality would be minor.

Impacts from Recreation

The greatest impacts from recreation would occur during competitive events, especially motorized events such as off-highway vehicle (OHV) races and rallies. Since no such events would be authorized in the Monuments, and non-motorized competitive events would not be allowed in ACECs, wilderness areas, or NPS proposed wilderness, impacts to air quality in these areas would be negligible. In the Arizona Strip FO, the annual Rhino Rally motorcycle race would be allowed to continue, but restricted primarily to roads and washes and limited to 300 entrants. The race would create elevated levels of fugitive dust and tailpipe emissions within the vicinity of the race. While overall impacts would be short term and minor, the intensity of impacts in the immediate vicinity of the race could be short term and moderate.

Impacts from Livestock Grazing

Where grazing and associated soil disturbances near stock waters and corrals have powdered the soil surface, fugitive dust would continue to be evident, especially during wind events. Permittee travel on unpaved roads for activities relating to grazing operations would also contribute to fugitive dust. Overall impacts to air quality from grazing would be localized and short-term, and could be rated from negligible to minor.

Alternative B

Impacts from Travel Management

Impacts to air quality would be similar to what is described under Alternative A in the Monuments due to no areas open to off-road travel, travel limited on designated roads and trails, acres closed to motorized and mechanized vehicle use, and no new permanent motorized route construction. Overall impacts, however, would be reduced in the Monuments as the public would have access to less than half of the amount proposed under Alternative A. In addition, roughly three-forth as many miles of roads would be closed and rehabilitated, which would decrease the potential for fugitive dust throughout the Monument. While considerably more miles of roads would be open to administrative use only compared to Alternative A, use of these roads would be relatively light with fewer impacts to air quality than compared to public-use roads.

In the Arizona Strip FO, while motorized and mechanized vehicle use would be limited to designated and existing roads and trails on the same number of acres as Alternative A, no public lands would be open to motorized and mechanized vehicle use under Alternative B, which would eliminate impacts from vehicle use in open areas. In addition, no motorized speed event areas would be designated as no such events would be authorized, which would eliminate impacts to air quality from such events. More miles of roads would be closed and rehabilitated throughout the Arizona Strip FO, further reducing the level of fugitive dust near the closed roads. Additional route maintenance activities including road upgrades (e.g., widening, passing lanes,

realignments, and travel surface upgrades) could occur under Alternative B compared to Alternative A. These activities would increase the potential for fugitive dust within the vicinity of the road improvement/construction activities, although mitigating measures would reduce such impacts. Additional impacts could occur due to possible increased traffic levels and/or speed limits on improved routes. Impacts would be localized, negligible to minor and short term.

For the entire Planning Area, installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern could help maintain the current very good air quality within the Planning Area. Only maintaining routes within their existing disturbed surface area would also limit impacts to air quality both from maintenance activities and travel on such routes. The impacts would be localized and range from negligible to minor.

Impacts from Vegetation and Fire and Fuels Management

The types of impacts experienced as a result of fire and fuels management would be similar to those described under Alternative A, although maximum acreage limits would be set for various ecological zones. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative B would result in more or less acreage being treated than under Alternative A. However, fewer treatment methods would be authorized under Alternative B, which could limit direct impacts.

Impacts from Soil, Air, and Water

Impacts would be the same as described under Alternative A.

Impacts from Special Status Species

Impacts would be the same as described under Alternative A.

Impacts from Minerals (Arizona Strip FO only)

Under Alternative B in the Arizona Strip FO, the same or nearly the same amounts of BLM lands proposed closed and withdrawn would occur compared to Alternative A, thus resulting in similar impacts. However, nearly twice as many acres would be designated closed to mineral material disposal compared to Alternative A, reducing the total area where impacts to air quality would occur. Impacts would be localized and minor.

Impacts from Recreation

Impacts would be the same as described under Alternative A, with the following exception that applies to the Arizona Strip FO only: Impacts resulting from competitive events would be

greatly reduced when compared to Alternative A, as no motorized speed events would be authorized. This would prevent the annual Rhino Rally from continuing in the Arizona Strip FO and thus eliminate the impacts to air quality from that and similar events.

Impacts from Livestock Grazing

The impacts would be the same as described under Alternative A.

Alternative C

Impacts from Travel Management

Impacts to air quality would be similar to that described under Alternative A due to no areas open to off-road travel, travel limited on designated roads and trails, and acres closed to motorized and mechanized vehicle use. Overall impacts, however, would be reduced as the public would have access to fewer miles of unpaved roads and more miles of roads would be closed and rehabilitated, which would decrease the potential for fugitive dust throughout the Monument compared to Alternative A, but not as much when compared to Alternative B. Differing from both Alternative B and A, new motorized routes could be constructed and additional route maintenance activities including road upgrades (e.g., widening, passing lanes, realignments, and travel surface upgrades) could occur. These activities could increase impacts to air quality within the vicinity of the road improvement/construction activities. Additional impacts could occur due to additional traffic on new routes and possible increased traffic and/or speed limits on improved routes. Impacts would be negligible area-wide, but could be minor to moderate along specific routes.

In the Arizona Strip FO, while motorized and mechanized vehicle use would be limited to designated and existing roads and trails on the same number of acres as Alternative A, more acres of BLM lands would be open to motorized and mechanized vehicle use under Alternative C, increasing the potential for impacts from vehicle use in open areas. However, more miles of roads would be closed and rehabilitated throughout the Arizona Strip FO compared to Alternative A, which would reduce fugitive dust stemming near the closed roads, but not as much as under Alternative B. Impacts from route maintenance/ improvement activities would be the same as described under Alternative B. When combined, impacts to air quality would be negligible to minor, depending upon the level of use, speed of vehicle, and climatic conditions (e.g., amount of wind, humidity, and soil moisture).

For the entire Planning Area, installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern would have the same impacts as described under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

The types of impacts experienced as a result of fire and fuels management would be similar to those described under Alternative A, with maximum acreage limits being set for various ecological zones. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative C would result in more or less acreage being treated than under Alternative A. More acres and treatment methods would be authorized than under Alternative B, potentially resulting in more, short-term direct impacts as a result of treatment efforts (e.g., fugitive dust from equipment use and smoke from prescribed fires). Less chance for indirect impacts would occur than under Alternative B, however, if less treatment efforts would result in greater risk of catastrophic fire.

Impacts from Special Status Species

Impacts would be the same as described under Alternative A.

Impacts from Protection of Resources: Soil, Air, and Water

Impacts would be the same as described under Alternative A.

Impacts from Minerals (Arizona Strip FO only)

Under Alternative C, similar amounts of BLM lands would be closed to fluid mineral leasing, withdrawn from mineral location, and closed to mineral material disposal as proposed under Alternative A, thus resulting in similar impacts. Compared to Alternative B, only a little more than half of that lands closed to mineral material disposal would occur, resulting in the potential for more impacts to air quality under Alternative C. Impacts would be localized and minor.

Impacts from Recreation

Impacts would be similar to that described under Alternative A, with the exception that, in the Arizona Strip FO, motorized speed events would only be authorized in the motorized speed event area in the St. George Basin. This would allow continuation of the annual Rhino Rally as it typically occurs in that area, and would concentrate all impacts from such events in the St. George Basin. While this would potentially increase short-term impacts to air quality within that area, it would reduce such impacts in other portions of the planning area.

Impacts from Livestock Grazing

The impacts would be the same as described under Alternative A.

Alternative D

Impacts from Travel Management

Impacts to air quality would be similar to that described under Alternative A due to no areas open to off-road travel, travel limited on designated roads and trails, and acres closed to motorized and mechanized vehicle use. Overall impacts, however, would be reduced as the public would have access to fewer miles of unpaved roads and a number of roads would be closed and rehabilitated, decreasing the potential for fugitive dust throughout the Monument. However, Alternative D would result in more impacts to air quality from fugitive dust compared to Alternative B and C due proposing more mileage of designated, unpaved roads and less mileage of closed roads. Impacts from the potential for new route construction and upgrades would be similar to that described under Alternative C.

While motorized and mechanized vehicle use in the Arizona Strip FO would be limited to designated and existing roads and trails on the same number of acres as Alternative A, nearly nine times the acres would be open to motorized and mechanical vehicle use when compared to Alternative A and nearly two times that compared to Alternative C. The relatively large size of open areas would considerably increase the potential for air quality impacts (e.g., fugitive dust and emissions) from vehicle use in and near such areas. While more miles of roads would be closed and rehabilitated throughout the Arizona Strip FO compared to Alternative A, reducing the level of fugitive dust near the closed roads, the amount of closed roads would be less than under Alternatives B and C. Impacts from route maintenance/improvement activities would be the same as described under Alternative B. When combined, impacts to air quality would be negligible to minor, depending upon the level of use, speed of vehicle, and climatic conditions (e.g., amount of wind, humidity, and soil moisture).

For the entire Planning Area, installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern would have the same impacts as described under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

The types of impacts experienced as a result of fire and fuels management would be similar to those described under Alternative A, with maximum acreage limits being set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative D would result in more or less acreage being treated than under Alternative A. More acres and treatment methods would be authorized compared to Alternatives B and C, which would result in more, short-term direct impacts as a result of treatment efforts (e.g., fugitive dust from equipment use and smoke from prescribed fires), but less chance for indirect impacts if more treatment efforts would result in reduced risk of catastrophic fire. Impacts would range from minor to moderate.

Impacts from Special Status Species

Impacts would be the same as described under Alternative A.

Impacts from Soil, Air, and Water

Impacts would be the same as described under Alternative A.

Impacts from Minerals (Arizona Strip FO only)

Under Alternative D, similar amounts of BLM lands would be closed to fluid mineral leasing, withdrawn from mineral location, and closed to mineral material disposal as proposed under Alternative A and C, thus resulting in similar impacts.

Compared to Alternative B, less than half of lands closed to mineral material disposal would occur, resulting in the potential for more impacts to air quality. Impacts would be localized and minor.

Impacts from Recreation

Impacts would be similar to that described under Alternative A with the exception that, in the Arizona Strip FO, air quality could slightly impacted in ACECs as competitive events could occur in ACECs. Impacts from motorized speed events would be similar to Alternative A, although permitting actual events, such as the Rhino Rally, would be determined on a case-by-case basis.

Impacts from Livestock Grazing

The impacts would be the same as described under Alternative A.

Alternative E: Proposed Plan

Impacts from Travel Management

Impacts to air quality in the Monuments would be similar to that described under Alternative A due to no areas open to off-road travel, travel limited on designated roads and trails, and acres closed to motorized and mechanized vehicle use. Overall impacts, however, would be reduced as the public would have access to fewer miles of unpaved roads and a number of roads would be closed and rehabilitated, decreasing the potential for fugitive dust throughout the Monuments. However, Alternative E would result in more impacts to air quality from fugitive dust compared to Alternative B and C, but less compared to Alternative D due to the mileage of designated,

unpaved roads and closed roads. Impacts from the potential for new route construction and maintenance/upgrades would be similar to that described under Alternative C.

In the Arizona Strip FO, while motorized and mechanized vehicle use would be limited to designated and existing roads and trails on the same number of acres as Alternative A, the number of acres open to motorized and mechanical vehicle would be approximately 7 times less acres than Alternative D. However, more acres would be closed to motorized and mechanized vehicle use under Alternative E, slightly decreasing impacts to air quality in comparison to Alternative D. Impacts from route maintenance/improvement activities would be the same as described under Alternative B. When combined, impacts to air quality would be negligible to minor, depending upon the level of use, speed of vehicle, and climatic conditions (e.g., amount of wind, humidity, and soil moisture).

Installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern would have the same impacts as described under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

The types of impacts experienced as a result of fire and fuels management would be similar to those described under Alternative A, with maximum acreage limits being set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative E would result in more or less acreage being treated than under Alternative A. Maximum acres and treatment methods would be more than under Alternative B but similar compared to Alternatives C and D, depending upon the ecological zone. This would result in more short-term direct impacts as a result of treatment efforts (e.g., fugitive dust from equipment use and smoke from prescribed fires) than under Alternative B, and more, less, or similar impacts compared to Alternative C and D. Less chance for indirect impacts would occur than under Alternative B if more treatment efforts would result in less risk of catastrophic fire, and similar chances for such impacts would occur when compared to Alternative C and D. The impacts would range from minor to moderate.

Impacts from Special Status Species

Impacts would be the same as described under Alternative A.

Impacts from Soil, Air, and Water

Impacts would be the same as described under Alternative A.

Impacts from Minerals (Arizona Strip FO only)

Under Alternative E, similar amounts of BLM lands would be closed to fluid mineral leasing, withdrawn from mineral location, and closed to mineral material disposal as proposed under Alternative A, C, and D, thus resulting in similar impacts.

Compared to Alternative B, almost two-thirds of lands closed to mineral material disposal would occur, resulting in the potential for more impacts to air quality under Alternative E. Impacts would be localized and minor.

Impacts from Recreation

Impacts would be the same as described under Alternative A for the Monuments, but same as Alternative C for the Arizona Strip FO.

Impacts from Livestock Grazing

The impacts would be the same as described under Alternative A.

Cumulative Impacts

The geographic area of analysis for cumulative impacts to air quality is the Arizona Strip, including both Monuments, as well as southern sections of California, Nevada, and Utah. This region influences the Planning Area's air quality due to regional haze from smog and dust. Considered having one of highest rates of population growth in the nation, continued population growth in the region would increase the amount of regional haze affecting the Planning Area. Construction of the Southern Corridor as well as increased use of Interstate 15 and other regional roads and highways would increase vehicle emissions and add to the regional haze that is blown into the Planning Area.

Increased population in the region would also result in increased levels of visitors to the Planning Area who travel on the mostly dirt and gravel roads. Such increased use would result in elevated levels of fugitive dust, as well as vehicle emissions in concentrated-use areas. Continuing or increasing gypsum and uranium mining in the region would also result in elevated levels of fugitive dust in the area from on-site activities and haul road use. Future droughts would also have long-term effects on air quality - as more vegetation cover would disappear, more acres of soils would become susceptible to wind events that would produce elevated levels of dust. Continued grazing during a drought would decrease vegetative cover and powder surface soils. Future creation of a Mohave County/Mesquite Habitat Conservation Plan and/or designation of critical habitats for future listings of up to 10 additional threatened or endangered species would reduce road use in more areas that would otherwise produce fugitive dust.

WATER

Impacts to water resources within the Planning Area are caused by cross-country vehicle travel, the use of vehicles on poorly constructed routes, mineral operations, livestock grazing, visitor use, and natural erosion. The effects of cross-country travel and livestock grazing include removal of surface cover (i.e., soil holding vegetation and rocks), displaced soil particles, increased soil compaction, creation of new flow paths and channels, and increased runoff. All of these combine to increase soil erosion and peak flood flows and cause sedimentation of water resources. The effects of travel on poorly constructed routes are similar to the cross-country effects. Thus, the greater the number of poorly constructed routes left open, the greater the impacts to surface water quality. The effects of livestock grazing and visitor use also include contamination of water sources from waste products.

Surface disturbing activities associated with minerals exploration, development, construction, and operations such as excavation, digging, and grading could increase runoff during storm events and contribute to water quality impairments downstream from the disturbed site.

Methods and Assumptions

The analysis of potential impacts to water resources is based on the expertise of BLM resource specialists at the Arizona Strip FO and the NPS staff at Lake Mead NRA. Combined, these staff members possess an extensive knowledge of water resources within Planning Area. The impact analysis is also based on review of existing literature and information provided by non-planning team experts in the BLM, NPS, and other agencies.

Quantifying effects to water resources, specifically to water quality, is difficult due to the lack of data. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: No changes to water quality would occur, or changes in water quality would be detectable but well below water quality standards or criteria, and would be within historical or desired water quality conditions.

Minor: Changes to water quality would be detectable, but well below water quality standards or criteria, and would be within historical or desired water quality conditions.

Moderate: Changes in water quality would be detectable but would be at or below water quality standards or criteria; however, historical baseline or desired water quality conditions would be altered on a short-term basis.

Major: Changes in water quality would be detectable and would be frequently altered from the historical baseline or desired water quality conditions and/or water quality standards or criteria would be slightly and singularly exceeded on a short-term basis.

Impacts to Water

Impacts to water resources in Parashant would result from actions proposed under the following resource management programs:

- Travel Management
- Vegetation and Fire and Fuels Management
- Soil, Air, and Water
- Special Status Species
- Wild Horse and Burros (Parashant only)
- Minerals (Arizona Strip FO only)
- Special Management Areas (Wild and Scenic Rivers; Vermilion and Arizona Strip FO)
- Recreation
- Livestock Grazing

Alternative A: No Action

Impacts from Travel Management

Under Alternative A, no parts of the Monuments would be open to motorized and mechanized cross-country vehicle travel as motor vehicles would be limited to designated roads and trails. As a result, impacts to water quality would be minimal. The construction of no new, permanent motorized routes and closing unnecessary roads where no public or administrative need exists would contribute to water quality protection. Impacts would be minor to moderate.

In the Arizona Strip FO, 803 acres would be open to motorized and mechanized vehicle use. Vehicle use, specifically OHV use, in open areas compared to designated and existing roads has the potential to cause the greatest amount of direct impacts to water quality in terms of erosion and runoff. Closing 123,100 acres would minimize such impacts within those areas closed. Overall impact to water quality would be minor.

Impacts from Vegetation and Fire and Fuels Management

Fire, mechanical, chemical, or biological means would be used to maintain, restore, or improve riparian areas to achieve healthy and productive ecological conditions. This would result in short-term impacts from treatment-related surface disturbing activities. It would also have long-term impacts in maintaining and improving water quality in riparian areas. Impacts would be minor to moderate.

While impacts to water resources from vegetation management typically occur from fire and fuel management, fuel loads are low in Vermilion and very little treatments would be expected. Impacts would thus be negligible to minor.

In Parashant, grazing would continue to be authorized in the Cane Springs area between November and December. This would allow for continued sedimentation resulting from erosion due to trampling and compaction, and continued contamination due to waste products in the spring area. Due to the short duration of cattle in the area, impacts would be minor. The Pakoon Springs area would remain in its current state as no rehabilitation efforts would occur.

Fire and fuels treatments could impact water quality by temporarily increasing erosion rates and runoff. Wildland fire use would potentially accelerate soil erosion and sedimentation, temporarily degrading water quality. Prescribed fires could increase erosion rates from fire-line construction, especially on steep slopes. This, in turn, could temporarily impact water quality. Mechanical treatments involving heavy equipment could increase soil compaction, slowing re-establishment of vegetation cover, and thus could temporarily impact water quality due to erosion and runoff. Chemical use could also temporarily impact water quality. Management prescriptions and post fire rehabilitation would help minimize some of these impacts, which would generally be minor and short-term. However, long-term impacts to water resources associated with catastrophic fire would be much greater due to extensive loss of vegetation cover, leading to erosion and runoff, and damaged by fire equipment off and on road to suppress the fires. Thus, while treatment would result in some direct but minor impacts to water quality, decreasing the potential of hazardous effects of unplanned wildfire by reducing fuel loads would result in indirect impacts to water quality that would be more widespread and longer term. Overall impacts would range from minor to moderate.

Impacts from Soil, Air, and Water

The application of specific mitigation measures identified in activity level planning and NEPA level review would reduce or prevent impacts to water quality. Avoiding floodplain occupancy and development would help protect the 100-year floodplain. Impacts would range from minor to moderate.

Impacts from Special Status Species

In Parashant, restrictions placed on livestock, vegetation management, recreation, transportation/access, and other surface disturbing activities within the Pakoon DWMA/ACEC would maintain and possibly improve water quality in that area by decreasing erosion rates. Because of the limited surface water in the area, consisting of a few springs and stock ponds, the impact would be minor. The impact would be negligible in terms of reducing salt contributions to the Colorado River. The modification, restriction, or prohibition made on activities that

degrade riparian habitat or reduce the potential of the area to support riparian vegetation would protect and/or improve water quality in riparian areas throughout Parashant.

No impacts would occur to water resources in Vermilion as a result of special status species management under Alternative A.

In the Arizona Strip FO, maintenance of the Virgin River ACEC at 8,075 acres for the protection of Virgin River fishes and managing land exchanges or disposals so that future developments would not adversely affect river flows in the Virgin River would help maintain water quality and quantity in the Virgin River. Modifying, restricting, or prohibiting actions that degrade riparian habitat or reduce the potential of the area to support riparian vegetation would help maintain the quality of water resources throughout the Arizona Strip FO. Impacts would be minor.

Impacts from Wild Horses and Burros

Keeping the herd management level for wild burros at zero in Parashant would continue to thwart impacts caused by trampling, compaction, and waste contamination of water resources from wild burros. Impacts would be minor.

Impacts from Minerals (Arizona Strip FO only)

Adherence to best management practices outlined in mining laws, plans of operation, pertinent restrictions, standard terms and conditions, etc., would help minimize impacts to water quality. Impacts would be minor. Closing or withdrawing areas from mineral operations would prevent such impacts within and downstream from the closed and withdrawn areas.

Impacts from Special Designations (Wild and Scenic Rivers)

Adhering to the interim management prescriptions to maintain the suitability determination of the Paria River study area in Vermilion and Virgin River study area in the Arizona Strip FO for inclusion in the National Wild and Scenic Rivers System and its tentative classifications would ensure protection of that water resource. Impacts would be minor.

Impacts from Livestock Grazing

Livestock grazing uses within the Monument would continue to be managed in keeping with applicable laws and regulations, and with the statewide standards and guidelines. Following these standards, the effects of livestock grazing on water quality in riparian areas would be assessed and appropriate and timely actions would be conducted to deal with those areas not meeting water quality standards. This would help to reduce the amounts of impacts to water resources.

Closing sensitive areas to grazing would help improve water quality and return riparian areas to proper functioning conditions. It would also eliminate impacts caused by stream-bank trampling and compaction, thus allowing for greater vegetation cover and reduced erosion rates. Increased vegetation in small drainages would trap sediments, improve water quality, increase the alluvial water holding capacity, and heal rill and gully erosion. Finally, making areas unavailable for grazing would eliminate waste contamination of water resources within those particular allotments. Under Alternative A, 199,350 acres in Parashant would not be available for grazing. Impacts within these areas could range from minor to moderate.

No allotments in the Arizona Strip FO are made unavailable under Alternative A. However, there are 2,566 acres managed in Vermilion that is on Glen Canyon National Recreation Area that are unavailable in all alternatives. Seasonal use would continue to apply to the River Pasture of the Lees Ferry Allotment. This would create the potential for water quality impairment of water resources in and near the allotments, including several springs and the Paria River, due to trampling, erosion, compaction, and waste products. However, seasonal restrictions, rest rotation schedule, and management practices following the statewide standards and guidelines would reduce the level of impacts. Impacts would range from minor to moderate.

Impacts from Recreation

Visitor use is expected to increase throughout the Planning Area, especially in the Monuments, which would continue to impact water resources in the area. Instituting and/or adjusting visitor limits, regulations, or restrictions in the Monument and limiting recreational activities (e.g., camping, recreational stock use, etc.) in sensitive habitats, such as riparian areas, would help limit impacts. In Vermilion, limits placed on visitor use would especially be important in such places as Paria Canyon and Buckskin Gulch where large numbers of visitors in a limited space adjacent to a watercourse could increase impacts to water quality from waste products, trailing, and erosion. The limits placed on total visitor numbers and group size in these areas would continue to minimize such impacts. In the Arizona Strip FO, current recreation use permits and use fees program required for use in the Virgin Gorge Recreation Area, subject to adaptive management decisions deemed necessary through monitoring, evaluation, and further planning, would help reduce and prevent impacts to water quality in the Virgin River.

Authorizing no motorized speed events in the Monuments would also help minimize impacts to water quality. Allowing the Rhino Rally to continue in the Arizona Strip FO, restricted primarily to roads and washes, could have localized impacts to water quality if such races occurred during or directly before/after rain events. Impacts would be minor and localized.

Alternative B

Impacts from Travel Management

In the Monuments, impacts to water resources would be similar to what is described under Alternative A. Additional protection would occur under Alternative B due to 445 miles of roads in Parashant and 179 miles of roads in Vermilion being be closed and rehabilitated. Impacts would be minor.

In the Arizona Strip FO, Alternative B is the most restrictive alternative in terms of OHV area designations, being the only alternative with no open areas, which would result in the least amount of impacts to water resources due to OHV use. However, additional road upgrade opportunities (e.g., widening, passing lanes, realignments, and travel surface upgrades) would be available under Alternative B and could result in greater impacts to water resources due to surface-disturbing activities, but would result in long-term improvements to water resources after upgrades are completed and properly working to reduce erosion and runoff. Impacts would be minor.

In the entire Planning Area, installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern could help reduce impacts to water quality.

Impacts from Vegetation and Fire and Fuels Management

Overall impacts to water resources in riparian areas would be similar to those described under Alternative A. Treatment priority that would be set for riparian areas aimed at improving and/or maintaining habitat conditions in important riparian areas would add to the protection of water resources. However, limits placed on riparian areas within Southwestern Willow Flycatcher habitat may reduce efforts to improve, maintain, or restore water quality in such habitats. Proposing no planned vegetation treatments and preventing surface disturbing activities in riparian areas would reduce the chance for water quality impairments in the short term, but potentially allow for future impacts due to continued degradation of riparian areas. Impacts would be site-specific and minor.

In Parashant, the entire Cane Springs pasture of Cane Springs Allotment would be unavailable to grazing and the spring area allowed to rehabilitate naturally. This would greatly improve the water quality and quantity in the spring area compared to Alternative A. Impacts would be localized and moderate. The Pakoon Springs area would be restored through natural process, which would improve water quality of the spring.

Impacts from fire and fuels treatment efforts would be similar to that described under Alternative A, although maximum acreage limits would be set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative B would result in more or less acreage being treated than under Alternative A, making comparing the impacts to water quality difficult. However, fewer treatment methods would be authorized under Alternative B, which could limit direct impacts.

Impacts from Soil, Air, and Water

Impacts would be similar to that described under Alternative A.

Impacts from Special Status Species

As under Alternative A, actions that degrade riparian habitat would be modified, restricted, or prohibited. Alternative B includes additional restrictions to recreational OHV use and camping that degrades habitat in riparian areas or areas with the potential to support riparian vegetation, which would help maintain and possible improve water quality in those areas by reducing soil erosion and compaction. Ensuring that riparian areas would be in proper functioning condition and be of sufficient quantity and quality for special status raptor species, Yellow-billed Cuckoos, and Yuma Clapper Rail would ensure protection of water resources in those riparian areas.

In Parashant, although the Pakoon ACEC would not be designated under this alternative, protections offered to water resources would continue to be applied to the Pakoon DWMA, which covers the same area as the ACEC. Impacts would thus be the same as described under Alternative A.

In the Arizona Strip FO under Alternative B, the Virgin River ACEC would be modified to include only the 100-year floodplain (approx. 2,063 acres), which is only slightly more than a quarter of the ACEC's size when compared to Alternative A. This would limit the amount of protection to water resources and potentially increase the amount of impacts to water quality and quantity in the Virgin River. Designating the Kanab Creek ACEC and following strict management prescriptions associated with that designation would help maintain, possibly improve, water quality in the Kanab Creek area.

Impacts from Wild Horses and Burros

Impacts would be the same as described under Alternative A

Impacts from Minerals (Arizona Strip FO only)

The types of impacts from fluid mineral leasing and mining location would be similar to those described under Alternative A since the amount of acres closed and withdrawn would be similar.

However, nearly twice as many acres would be designated closed to mineral material disposal compared to Alternative A, which would result in less impact to water resources.

Impacts from Special Designations (Wild and Scenic Rivers)

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

The overall impacts from livestock grazing would be similar to that described under Alternative A. Additional lands made unavailable for grazing and seasonal restrictions would improve water resources within those specific allotments in the manner described under Alternative A. Impacts would be localized and minor.

Impacts from Recreation

Overall impacts to water quality would be similar to that described under Alternative A, with the exception that not authorizing motorized speed events in the Arizona Strip FO would eliminate impacts from such activities.

Alternative C

Impacts from Travel Management

Overall impacts to water resources in the Monuments would be similar to what is described under Alternative A. One difference is that more protection to water resources would occur under Alternative C due to 224 miles of roads in Parashant and 110 miles in Vermilion being be closed and rehabilitated, although this is only half as many miles closed when compared to Alternative B. Alternative C would also allow for additional road upgrade opportunities (e.g., widening, passing lanes, realignments, and travel surface upgrades), which could result in greater impacts to water resources due to surface-disturbing activities, but would result in long-term improvements to water resources after upgrades are completed and properly working to reduce erosion and runoff. Impacts would be minor.

In the Arizona Strip FO, almost twice the acres of public lands would be open to motorized and mechanized vehicles under Alternative C compared to Alternative A, increasing the potential for impacts to water resources. Additional impacts would be negligible due to the relatively small increase in open areas. Impacts from additional road upgrade opportunities would be the same as under Alternative B.

In all three planning areas, impacts from installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately

obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern would be the same as under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

As under Alternative B, efforts at maintaining and improving habitat conditions in important riparian areas would maintain or improve water quality and quality in those areas. Under Alternative C, however, there would be more management and treatment occurring within the Riparian Ecological Zone, which would increase the chance for water quality impairments in the short term, but potentially reduce future impacts due to continued degradation of riparian areas. Impacts would be site-specific and minor.

In Parashant, the riparian area of the Cane Springs pasture would be open for seasonal grazing with the fence around the upper springs repaired. While the fence would prevent erosion from trampling and water quality impairment from waste products, the rest of the pasture would be susceptible to trampling, vegetation loss, and waste products, which could indirectly impair water quality during rain events. Seasonal restrictions would reduce such impacts. Impacts would be minor

Impacts from fire and fuels treatment efforts would be similar to that described under Alternative A, although maximum acreage limits would be set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative C would result in more or less acreage being treated than under Alternative A, making comparing the impacts to water quality difficult. More acres would be treated than under Alternatives B, resulting in more, short-term impacts to water quality but less potential for indirect, longer-term impacts if more treatment efforts would result in less risk of catastrophic fire. Such impacts would range from minor to moderate.

Impacts from Soil, Air, and Water

Impacts would be the same as described under Alternative A.

Impacts from Special Status Species

Impacts would be similar to those described under Alternative B, with the exception of impacts from the proposed Kanab Creek ACEC in the Arizona Strip FO. This ACEC would be 3,935 acres smaller than under Alternative B, thus reducing the amount of protection afforded to water resources in the Kanab Creek area.

Impacts from Wild Horses and Burros

Impacts would be the same as described under Alternative A.

Impacts from Minerals (Arizona Strip FO only)

The types of impacts from fluid mineral leasing and mining location would be similar to those described under Alternative A since the amount of acres closed and withdrawn would be similar. However, more acres would be designated closed to mineral material disposal compared to Alternative A, which would result in less impact to water resources.

Impacts from Special Designations (Wild and Scenic Rivers)

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

The overall impacts from livestock grazing would be similar to those described under Alternative A. The season of use would be shorter in some grazing allotments compared to Alternative A, but longer compared to Alternative B. This would result in less impacts to water resources in these allotments compared to Alternative A but more impacts compared to Alternative B. Ephemeral extensions would be allowed under Alternative C in the Pakoon Allotment and the Grand Gulch Wash area would be open to grazing. This would result in greater impacts to water resources in those areas due to grazing compared to both Alternatives A and B.

Impacts from Recreation

Overall impacts to water resources would be similar to that described under Alternative A, with the exception of impact from motorized speed events in the Arizona Strip FO. Under Alternative D, a motorized speed event area would be created in the St. George Basin. This would isolate impacts from such events to a specific, geographic area.

Alternative D

Impacts from Travel Management

Overall impacts to water resources in the Monuments would be similar to what is described under Alternative A. One difference is that more protection to resources would occur under Alternative D due to 148 miles of roads in Parashant and 93 miles in Vermilion being be closed and rehabilitated, although this is less closed miles compared to Alternatives B and C. Impacts from additional road upgrades would result in impacts similar to those described under Alternative C.

In the Arizona Strip FO, nearly nine times the acres of public lands would be open to motorized and mechanized vehicle under Alternative D, increasing the potential for impacts to water resources. Overall impacts would be minor. Impacts from additional road upgrade opportunities would be the same as under Alternative B.

Impacts from installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern would be the same as under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

As under Alternative B, efforts at maintaining and improving habitat conditions in important riparian areas would maintain or improve water quality and quality in those areas. Under Alternative D, however, there would be more management and treatment occurring within the Riparian Ecological Zone than under Alternatives B and C, which would increase the chance for water quality impairments in the short term, but potentially reduce future impacts due to continued degradation of riparian areas. Impacts would be site-specific and minor.

In Parashant, seasonal grazing of the Cane Spring Pasture of the Mud and Cane Allotment would be authorized, which would result in similar impacts to water resources in those areas as described under Alternative A, but greater impacts when compared to Alternatives B and C. Repairing and maintaining the fence around the upper springs would help minimize direct impacts to water quality in those springs.

Impacts from fire and fuels treatment efforts would be similar to that described under Alternative A, although maximum acreage limits would be set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative D would result in more or less acreage being treated than under Alternative A, making comparing the impacts to water quality difficult. More short-term impacts but potentially less long-term impacts would occur compared to Alternatives B and C due to more acres being treated. Impacts would range from minor to moderate.

Impacts from Soil, Air, and Water

Impacts would be the same as described under Alternative A.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B, with the exception of impacts from the Kanab Creek ACEC in the Arizona Strip FO. As under Alternative A, the Kanab Creek ACEC would not be designated under Alternative D. As a result, the Kanab Creek area would not receive the benefits to water resources that would occur under such a designation.

Impacts from Wild Horses and Burros

Impacts would be the same as described under Alternative A.

Impacts from Minerals (Arizona Strip FO only)

The impacts from mineral management would be similar to those described under Alternative A since the amount of acres closed to fluid mineral leasing and withdrawn to mining location would be similar. The least number of acres designated closed to mineral material disposal would occur under Alternative D compared to the other alternatives, resulting in the greatest potential for impacts to water resources. Impacts would be minor.

Impacts from Special Designations (Wild and Scenic Rivers)

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

The overall impacts from livestock grazing would be similar to those described under Alternative A. However, Alternative D proposes the least amount of restrictions on lands available for grazing or season of use among the alternatives, resulting in a greater potential for impacts to water resources in specific allotments. Development of new stock waters would cause additional impacts to water quality by creating new areas where livestock concentrate.

Impacts from Recreation

Overall impacts to water quality would be similar to that described under Alternative A, with the exception of impacts in the Arizona Strip FO from motorized speed events. Under Alternative D, such events would be authorized on a case-by-case basis. It is uncertain whether this would result in more or fewer such events.

Alternative E: Proposed Plan

Impacts from Travel Management

Overall impacts to water resources would be similar to what is described under Alternative A. One difference is that more protection to resources would occur in the Monuments under Alternative E due to 188 miles of roads in Parashant and 113 miles in Vermilion that would be closed and rehabilitated, although fewer miles would be closed compared to Alternatives B and C, but more compared to Alternative D. Impacts from additional road upgrades would result in impacts similar to those described under Alternative C.

In the Arizona Strip FO, the amount of acres open to motorized and mechanized use would be approximately 7 times less than acres in Alternative D, decreasing the potential for impacts to water resources from OHV use in these areas. Overall impacts would be minor. Impacts from additional road upgrade opportunities would be the same as under Alternative B.

Impacts from installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern would be the same as under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

Impacts to water resources in riparian areas would mostly resemble that described under Alternative C. In addition, in Parashant, extensive site management of grazing and all associated facilities in the Riparian Pasture of the Mud and Cane allotment would help ensure protection and possible improvement of water quality in the area, although surface-disturbing activities associated with trail and facility development may result in short-term impacts to water resources.

Impacts from fire and fuels treatment efforts would be similar to that described under Alternative A, although maximum acreage limits would be set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative E would result in more or less acreage being treated than under Alternative A, making comparing the impacts to water quality difficult. More short-term impacts but potentially less long-term impacts would occur compared to Alternatives B due to more acres being treated, and less or similar impacts would occur compared to Alternative C or D, depending upon ecological zone. Impacts would range from minor to moderate.

Impacts from Soil, Air, and Water

Impacts would be the same as described under Alternative A.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B

Impacts from Wild Horses and Burros

Impacts would be the same as described under Alternative A.

Impacts from Minerals (Arizona Strip FO only)

The impacts from mineral management would be similar to those described under Alternative A since the amount of acres closed to fluid mineral leasing and withdrawn to mining location would be similar. Impacts would be minor.

Impacts from Special Designations (Wild and Scenic Rivers)

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

The overall impacts from livestock grazing would be similar to those described under Alternative A. Impacts from lands available or unavailable for grazing or with seasonal restrictions would be the same as under Alternative C or D, depending upon the allotment.

Impacts from Recreation

Overall impacts would be similar to that described under Alternative A, with impacts from motorized speed events in the Arizona Strip FO being the same as under Alternative C.

Cumulative Impacts

The geographic area of analysis for cumulative impacts to water resources is the Planning Area and drainages of the Virgin and Paria rivers and Kanab Creek located in Southern Utah. Population growth and development would continue to increase the demand for water and the need to divert water from streams and springs, ultimately reducing the number and size of riparian areas. Increasing OHV use would result in more soil surface damage and erosion. Driving off road would continue to increase sediment and salt loads of streams. Some roads intercept land surface flows, drying out some down slope sites and channelizing the water to specific release points where it scours or dumps sediments on once stable areas. Livestock grazing would continue to decrease vegetative cover and infiltration rates and increase runoff, erosion, peak flows, compaction, runoff sediment, and salt loads in areas of concentrated use, such as near stock waters and corrals. Some springs would continue to be trampled and contaminated with animal wastes. Stock ponds reduce down stream peak flows while some may recharge local aquifers. Mineral development would increase runoff, erosion, and sediment loading in construction and mining areas. Additional mining roads would increase sediment and salt loads of streams and alter some down slope sites. Future droughts would result in decreasing vegetation and spring flow. The Fort Pearce Community Watershed Plan, the Upper Langs Run Watershed Management Plan, and the Fort Pearce Wash Salinity Control Plan would continue to reduce erosion and downstream peak flows, protect microbiotic soils, and trap saline sediments.

SOILS

Soils within the Planning Area are susceptible to impacts from compaction and disturbance, which can lead to accelerated erosion, soil loss, and reduced productivity. Management actions that involve ground-disturbing activities, reducing vegetation cover, trampling, and using vehicles and heavy machinery can result in such impacts, especially in areas where geologic erosion is occurring. Similar to water resources, the greatest impacts to soil come from cross-

country vehicle travel, the use of vehicles on poorly constructed routes, mineral operations, livestock grazing, and visitor use. The effects of cross-country travel and livestock grazing include reduction or disturbance of surface cover (i.e., soil-holding vegetation, litter, and rocks), displaced soil particles, increased soil compaction, creation of new flow paths and channels, and increased runoff. All of these combine to increase soil erosion and ultimate loss. The effects of travel on poorly constructed routes are similar to the cross-country effects. Thus, the greater the number of poorly constructed routes left open, the greater the impacts through compaction and erosion.

Site-specific surface disturbing activities associated with minerals exploration, development, construction, and operations such as excavation, digging, and grading result in soil displacement and compaction, ultimately leading to erosion during rain events.

Widespread effects of livestock grazing include compaction and surface crust destruction through trampling and decreasing vegetative ground cover, thereby increasing runoff and erosion and reducing water holding capacity and infiltration rates. Visitors engaged in off-road motorized or non-motorized activities also compact the soil, although the intensity of impact is much less for the non-motorized group. Camping also results in soil compaction and vegetation loss in small areas. Since wildland soils are finite non-renewable resources, all impacts leading to soil loss or to negative changes in soil characteristics, can have irreversible consequences. Some soil types are in danger of being lost, along with their ecosystems.

Methods and Assumptions

The analysis of potential impacts to soils is based on the expertise of BLM resource specialists at the Arizona Strip FO and the NPS staff at Lake Mead NRA. Combined, these staff members possess an extensive knowledge of soil resources within the Planning Area. The impact analysis is also based on NRCS soil surveys, other agency maps and documentation, review of existing literature, and information provided by non-planning team experts in the BLM, NPS, and other agencies.

General soil types, erosion potential, structure, and function were discussed and impacts were analyzed. The analysis was based on reference information, site investigations, lab analyses, soil mechanics and engineering criteria, anticipated effects of management actions by alternative, and professional interpretation and judgment. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. When impacts are positive, it is so stated. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: The amount of soil loss or erosion, or changes in soil characteristics would be at or below the level of detection.

Minor: The amount of soil loss or erosion, or changes in soil characteristics would be small, as would the area affected. If mitigation were needed to offset adverse effects, it would be relative simple to implement and would likely be successful.

Moderate: The amount of soil loss or erosion, or changes in soil characteristics would be readily apparent and result in a change in the productivity of the soil over a relatively wide area. Mitigating measures probably would be necessary to offset adverse effects and would likely be successful.

Major: The amount of soil loss or erosion, or changes in soil characteristics would be readily apparent and long-term and would substantially change the productivity of the soils over a large area. Extensive mitigation measures to offset adverse effects would be needed, and their success could not be guaranteed.

Impacts to Soils

Impacts to soils would result from actions proposed under the following resource management programs:

- Travel Management
- Vegetation and Fire and Fuels Management
- Soil, Air, and Water
- Special Status Species
- Wild Horse and Burros (Parashant only)
- Minerals (Arizona Strip FO only)
- Special Designations (ACECs)
- Recreation
- Livestock Grazing
- Lands and Realty

Alternative A: No Action

Impacts from Travel Management

Under Alternative A, no parts of the Monuments would be open to motorized and mechanized cross-country vehicle travel as motor vehicles would be restricted to designated roads and trails. Since cross-country travel is the most destructive to soils, this would have a moderate impact at protecting soils throughout the Monument. In the Arizona Strip FO, 803 acres would be open to motorized and mechanized vehicle use. Vehicle use, specifically OHV use, in open areas compared to designated and existing roads has the potential to cause the greatest amount of direct impacts to soils in terms of increasing erosion and runoff.

Many miles of routes designated as open to motorized/mechanized travel by the public throughout the Planning Area are non-graded, two-track trails. The use of such roads would have minor impacts on soils that are the most susceptible to compaction and rutting.

Use of non-motorized, wheeled game carriers would be allowed except in designated and NPS-proposed wildernesses. Such use could result in slight soil compaction, but impacts would be negligible. Direct impacts would occur to soils from road maintenance and use, resulting in road-edge disturbance, isolated erosion, and strong compaction. However, such impacts would be limited due to the focus on maintaining instead of enhancing existing roads. These impacts would be local, minor to moderate, and long-term. Allowing no new route construction in the Monuments, and closing and rehabilitating roads where no public or administrative need exists would contribute to soil protection. Impacts would be positive and minor to moderate.

Impacts from Vegetation and Fire and Fuels Management

Restoration and vegetation treatment projects aimed at improving vegetation health and cover would reduce erosion potential and increase soil productivity. However, mechanical, manual, or chemical treatments could result in soil compaction, some loss in vegetation cover, erosion, and changes in soil chemistry. Restrictions in sensitive areas would help protect fragile soil resources in such habitats. Treatment methods that cause substantial surface disturbance would generally not be permitted, protecting soils in the area. Impacts would be positive and would range from minor to moderate.

The majority of impacts to soils from vegetation management would occur from fire and fuel management. Wildland fire use would temporarily accelerate soil erosion and sedimentation, and potentially impact the physical, hydrological, chemical, and microbial properties of soil, lowering the productive potential. Prescribed fires could increase erosion rates from fire-line construction, especially on steep slopes. Mechanical treatments involving heavy equipment could increase soil compaction and runoff, slowing re-establishment of vegetation cover, and could thus result in erosion. Mechanical and chemical use could also impact soil chemistry and productivity. Management prescriptions and post fire rehabilitation would help minimize some of these impacts. Following minimum tool policy emphasizing hand tools, aircraft, and other suppression methods that result in the least amount impacts to soils would minimize impacts in wilderness areas. These impacts would be minor but long-term. However, impacts to soils associated with catastrophic fire would be much greater due to a high percentage of vegetative cover loss and intense deep heating, resulting in soil sterilization and creation of hydrophobic surface layers. Use of heavy fire equipment off and on road to suppress the fires would cause compaction, and chemical retardant could alter soil chemistry. Thus, while treatment would result in some direct but minor impacts to soils, decreasing the potential of hazardous effects of unplanned wildfire by reducing fuel loads would result in positive indirect impacts to soils that would be more widespread and longer term. Impacts would range from minor to moderate.

Impacts from Soil, Air, and Water

Specific stipulations and permit requirements, including reclamation plans, to protect soils during and after surface disturbing activities in the Planning Area would minimize impacts. These include restriction that all surface disturbing activities be the minimum necessary to complete the task; reclamation plans for road upgrades and/or realignments; specific soil stability measures for all surface disturbing activities and saline soils; closing and reclaiming temporary roads, facilities, and improvements that are unnecessary; and emphasizing areas of moderate to severe erosion in Allotment Management and Watershed Management Plans. Impacts would be minor Monument-wide, but potentially moderate at specific sites.

Impacts from Special Status Species

Maintenance or restoration of special status species habitats would help maintain soil productivity and limit erosion and could involve improving the condition of soils within those habitats.

The Pakoon ACEC in Parashant includes areas with severe erosion potential and areas with highly fragile microbiotic crusts. Restrictions that would be maintained under Alternative A on livestock grazing, vegetation management, recreation, transportation/access, wild burros, and other surface disturbing or soil compacting activities within the ACEC would continue to limit erosion. This impact would be positive and minor throughout the ACEC, but potentially moderate in specific areas.

In the Arizona Strip FO, restrictions placed on the use of track vehicles, vegetation treatments, rights of way (ROWs), campgrounds, and other surface disturbing activities in desert tortoise habitat would also protect soils within such habitats. Retaining all BLM lands within desert tortoise critical habitats would help protect soils within those habitats. Maintenance of the special status species ACECs would continue protection of soils within their boundaries due to restrictions on surface disturbing activities. Impacts would be greatest in areas with compactable soils and severe wind and water erosion potential. Overall impacts to soils would be minor to moderate, long term, and site-specific.

Impacts from Wild Horses and Burros

Keeping the Herd Management Level for wild burros at zero in Parashant would eliminate impacts to soils caused by trampling, compaction, and reduced vegetation cover from wild burros. Impacts would be positive and negligible to minor.

Impacts from Minerals (Arizona Strip FO only)

In the Arizona Strip FO, adherence to best management practices outlined in mining laws, plans of operation, pertinent restrictions, standard terms and conditions, etc., would help minimize

impacts to soils. Impacts would be minor. Closing or withdrawing areas from mineral operations would prevent impacts to soils within those areas.

Impacts from Livestock Grazing

Livestock grazing within the Planning Area would continue to be managed in keeping with applicable laws and regulations, and with the statewide standards and guidelines. If the statewide standards and guidelines are met, upland soils would exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform. Impacts would be minor area-wide, but potentially moderate in specific areas such as the Riparian Ecological Zone.

Closing sensitive areas to grazing would reduce soil compaction and erosion, stabilize soil surfaces, and restore productivity. Organic, surface crusts would slowly redevelop where there are now physical crusts, increasing the infiltration rate and reducing erosion. Under Alternative A, 199,350 acres in Parashant would not be open to grazing. This would reduce the amount of surface disturbance, compaction, and erosion from grazing activities. Impacts would be positive and minor to moderate, especially on those allotment soils that are susceptible to compaction and erosion

No allotments are unavailable to grazing in the Arizona Strip FO under Alternative A. However, there are 2,566 acres managed in Vermilion that is on Glen Canyon National Recreation Area that are unavailable in all alternatives. Seasonal use would apply to some allotments. These include the river pasture of the Lees Ferry Allotment in Vermilion and the desert tortoise and Southwestern Willow Flycatcher allotments in the Arizona Strip FO. Grazing in these allotments would create the potential for impacts to soils from trampling and vegetation removal, resulting in compaction and erosion. Seasonal restrictions following statewide standards and guidelines would reduce the level of impacts. Impacts would be long term, site specific, and minor.

Impacts from Recreation

Visitor use is expected to increase throughout the Planning Area, which would continue to impact soil resources. Instituting and/or adjusting visitor limits, regulations, or restrictions and limiting recreational activities (e.g., camping, recreational stock use, etc.) in sensitive habitats would help limit impacts to soil resources. Responding to unacceptable resource conditions, including those relating to soils, would also help keep impacts at a low level. Areas where public recreation use is concentrated, such as campgrounds, trails, trail heads, and near visitor facilities, would experience the most soil compaction and erosion and a loss or reduction of vegetation cover. Under Alternative A, most recreation would be dispersed. Facility development would be minimal (e.g., directional, interpretive, or safety signing; interpretive sites; or kiosks) and be located along roadways. Signing may protect soil resources though preventing or reducing off-road damage. Overall impacts would be minor, but potentially moderate in highly concentrated recreation areas.

Paria Canyon, Buckskin Gulch, Wire Pass, and Coyote Buttes are areas in Vermilion where large numbers of visitors in a limited space could affect soils through compaction and surface disturbance, leading to increased wind and water erosion. These areas would experience the most amount of soil compaction and loss or reduction of vegetation cover, as well as destruction of biological crusts. Under Alternative A, limits would be placed on total visitor numbers and group size in these areas, which would continue to minimize these impacts. Monitoring and using an adaptive management program to address necessary changes to visitor use numbers could help limit unacceptable impact to soils. Soils would be protected from trampling and compaction in areas where horses and pack stock would be prohibited (in Paria Canyon upstream from Bush Head Canyon), but would become susceptible from such impacts where horses and pack stock are allowed. Impacts would be minor to moderate, long term, and site specific.

The greatest impacts to soils would occur from off-road vehicle use and motorized speed events. While no areas within the Monuments would be open to off-road vehicle use and no motorized speed events would be authorized, it is likely that some illegal off-road activities would occur. In the Arizona Strip FO, the annual Rhino Rally motorcycle race would be allowed to continue under Alternative A, but restricted primarily to roads and washes and limited to 300 entrants. The race could increase erosion levels along the course due to the volume of participants and the actual course used. While overall impacts would be short term and minor, the intensity of impacts in the immediate vicinity of the race could be long term and moderate due to post-race use.

Impacts from Lands and Realty

In the Monuments, the appropriation and withdrawal of all federal lands and interests in lands from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws provided protection to soils under federal management practices as well as protecting the Monuments from certain surface disturbing activities that could cause compaction and erosion. Processing no new ROWs and ancillary public facilities, with a few exceptions, would also limit impacts to soils. Impacts would be positive, long-term, and negligible.

In the Arizona Strip FO, acquiring non-federal lands in Virgin River riparian areas, DWMAs/ACECs, wilderness areas, and Resource Conservation Areas (RCAs), and reserving and/or managing them as part of the NLCS unit or administratively designated area would provide protection to soils within these lands due to the restrictions placed on surface disturbing activities by the BLM. Retaining designated or proposed critical habitat and lands supporting listed species would continue to provide protection to soils in these areas. Identifying up to 7,335 acres for exchange, sale, or R&PP sales and an additional 17,853 acres for exchange, for a total of 25,188 acres, would make these lands susceptible to increased impacts to soils compared with retaining the land in federal ownership, although prospective future owners would be advised on the need for Endangered Species Act (ESA) compliance. Any new land use authorizations (ROWs, permits, leases, easements, etc.) would impact soils through compaction

and vegetation removal, which could lead to erosion. Impacts would be minor to moderate and localized.

Alternative B

Impacts from Travel Management

Overall impacts would be similar to what is described under Alternative A. Additional protection to soils would occur under Alternative B due to 445 miles of roads in Parashant and 179 miles in Vermilion being be closed and rehabilitated, which is the most acres and miles closed among the alternatives. In addition, 1,089 less miles in Parashant and 274 less miles in Vermilion would be open to motorized/mechanized travel by the public, which would reduce total miles of non-graded, two-track trails that would experience compaction and rutting. Impacts would be site specific, long term, and range from minor to moderate. Prohibiting wheeled game carriers throughout the Monuments would also protect soils from compaction, although the impact would be negligible. Limiting route maintenance to within the exiting disturbed surface area would also reduce further soil compaction and erosion.

In the Arizona Strip FO, Alternative B is the most restrictive alternative in terms of OHV area designations, being the only alternative with no open areas and no authorization for motorized speed events. Although fewer acres would be closed to motorized and mechanized vehicle use, impacts to these areas would be negligible due to other forms of protection. In addition, no new motorized routes would be considered in listed species habitat and non-motorized trail construction would be considered only when needed to protect sensitive resources, minimizing the impacts to soil from these activities. Alternative B would thus result in the least amount of impacts to soils as a result of OHV use and route/trail construction. However, additional road upgrade opportunities (e.g., widening, passing lanes, realignments, and travel surface upgrades) would be available under Alternative B and could result in greater impacts to soils due to surface-disturbing activities than under Alternative A, but would result in long-term improvements to soil resources after upgrades are completed and properly working to reduce erosion and runoff. Impacts would be localized and minor. Prohibiting wheeled game carriers in ACECs as well as designated wildernesses would protect soils from compaction within the ACECs, although the impact would be negligible.

For the entire Planning Area, installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern could help reduce impacts to soils. Impacts would be minor, long term, and site specific.

Impacts from Vegetation and Fire and Fuels Management

Overall impacts to soils would be similar to those described under Alternative A. Additional protection would occur on NPS lands in Parashant due to the development of individual restoration plans that include measures to reduce soil erosion.

Under Alternative B in Parashant, the entire Cane Springs pasture of Cane Springs Allotment would be unavailable to grazing and the spring area allowed to naturally rehabilitate. This would result in decreased surface disturbance, erosion, and compaction and increased vegetation cover in the pasture compared to Alternative A. Impacts would be moderate. Also under Alternative B, the Pakoon Springs area would be restored through natural process, which would decrease soil erosion and improve soil productivity through time. Impacts would be minor.

Impacts from fire and fuels treatment efforts to soils would be similar to that described under Alternative A for the entire Planning Area, although maximum acreage limits would be set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative B would result in more or less acreage being treated than under Alternative A, making comparing the impacts to soils difficult. However, fewer treatment methods would be authorized under Alternative B, which could limit direct impacts.

Impacts from Soil, Air, and Water

Impacts would be similar to that described under Alternative A. Additional protection to soils would result from emphasizing management of all allotments in Watershed Condition Class IV to reduce erosion and improve the watershed condition class. In addition, Upper Lang's Run, Black Rock Mountain, and Parashant watersheds, portions of which are located in both Parashant and the Arizona Strip FO, would receive priority for assessment, treatments, and/or restrictions on use to reduce erosion. The same priority would be given to Lower Hurricane Valley, Fort Pearce Salinity Area, Clayhole Flood Control Structures Area, and Wild Band Valley watersheds, all of which are located in the Arizona Strip FO. Priority would be given to all watersheds in Vermilion for assessment, treatments, and/or restrictions on use to reduce erosion. Impacts would be localized and minor.

Impacts from Special Status Species

Restrictions placed on livestock grazing, fire management, and recreation (e.g., OHV use, camping, and horseback riding) that degrades special status species habitat would limit soil erosion and compaction in those habitats. Impacts would be site specific and minor.

In Parashant, although the Pakoon ACEC would not be designated under Alternative B, protections offered to soil resources would continue to be applied to the Pakoon DWMA, which covers the same area as the ACEC. Impacts would thus be the same as described under Alternative A.

In Arizona Strip FO, there would be some additional restrictions on surface-disturbing activities from fire management, grazing, recreation, and development of facilities in special status species habitats that would provide additional protection to soils within those habitats. Impacts would be minor and site specific. Designating additional or increasing the size of existing ACECs would help protect soils within the ACECs due to specific restrictions on grazing, recreation, vegetation treatment, and other surface disturbing activities. Impacts would be greatest in compactable soils and areas with severe wind and water erosion potential. Overall impacts to soils would be long term, site specific, and range from minor to moderate.

Impacts from Wild Horses and Burros

Impacts would be the same as described under Alternative A.

Impacts from Minerals (Arizona Strip FO only)

The types of impacts from fluid mineral leasing and mining location would be similar to those described under Alternative A since the amount of acres closed and withdrawn would be similar. However, nearly twice as many acres would be designated closed to mineral material disposal compared to Alternative A, which would result in less impact to soils.

Impacts from Livestock Grazing

Overall impacts from livestock grazing would be similar to that described under Alternative A. Additional lands made unavailable for grazing and seasonal restrictions would benefit soils within those specific allotments by eliminating any potential impacts to soils from trampling, and would increase vegetative cover and benefit biological crusts. Lands unavailable for grazing and/or with restrictions involve desert tortoise allotments in Parashant and the Arizona Strip FO, Willow Flycatcher allotments in the Arizona Strip FO, and the river pasture of the Lees Ferry Allotment in Vermilion. Impacts would be long term, site specific, and range from minor moderate.

Impacts from Recreation

Overall impacts from visitor use would be similar as described under Alternative A. Added protection to soils in the Monuments would result from additional restrictions on camping, including limiting camping to designated sites only. While soil disturbance, compaction, and erosion would be greater at small, more concentrated use sites, such as designated camping areas, limiting camping to these areas would limit the creation of new areas of compaction and erosion. In Vermilion, prohibiting stock use in Paria Canyon would eliminate impacts to soils from such use. Impacts would be minor. In the Arizona Strip FO, soils would receive added protection due to no motorized speed events being authorized. Impacts would be site specific, long term, and range from minor to moderate.

Impacts from Lands and Realty

Retaining lands and interests in lands (including minerals) in federal ownership within NLCS units (e.g., designated wilderness, National Monuments, NHTs), administratively designated areas (e.g., ACECs), areas allocated to maintain wilderness characteristics, Wild and Scenic River study areas, DWMAs, critical habitat, lands supporting listed species, important riparian areas, and springs, seeps, etc., and reserving and/or managing them as part of the NLCS unit or administratively designated area would provide protection to soils within these lands due to the restrictions placed on surface disturbing activities by the BLM. Identifying 1,507 fewer acres in the Arizona Strip FO for exchange, sale, or R&PP lease/sale would result in fewer impacts to soils due to more acres being retained in federal ownership. Fewer and/or more restrictive new land use authorizations (ROWs, permits, leases, easements, etc.) would occur under Alternative B, resulting in fewer impacts to soils.

Alternative C

Impacts from Travel Management

Overall impacts would be similar to that described under Alternative A. Additional protection to soils in the Monuments would occur under Alternative C due to 224 miles of roads in Parashant and 110 miles in Vermilion being be closed and rehabilitated, although this is less than proposed under Alternative B. In addition, fewer miles would be open to motorized/mechanized travel by the public, which would reduce total miles of non-graded, two-track trails that would experience compaction and rutting; however, not as much as under Alternative B. Differing from both Alternative B and A, new road and trail construction would be allowed in the Monuments, which would increase surface disturbance, compaction, and erosion in the area of the constructed routes. Another difference is that additional road upgrade opportunities (e.g., widening, passing lanes, realignments, and travel surface upgrades) could result in greater impacts to soils due to surface-disturbing activities, but would result in long-term improvements to soils after upgrades are completed and properly working to reduce erosion and runoff. Overall impacts would be site specific, long term, and range from minor to moderate.

In the Arizona Strip FO, impacts from the number of acres closed to motorized and mechanized vehicle use and route maintenance activities would be similar to Alternative B; however, there would be fewer restrictions on new permanent motorized route and non-motorized trail construction, which could increase the potential for impacts to soils from such activities. Impacts would be localized and minor. Impacts from a designated motorized speed event area would be similar to Alternative A. Impacts from wheeled game carriers would be the same as under Alternative B, with the exception that they would be allowed in areas having wilderness characteristics, although this would have no additional impact to soils.

For the entire Planning Area, installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern would have the same impacts as under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

Overall impacts to soils would be similar to those described under Alternative B, including impacts from the development of individual restoration plans on NPS lands.

Under Alternative C, the riparian area of the Cane Springs pasture would be open for seasonal grazing with the fence around the upper springs repaired. While the fence would prevent further compaction and vegetation loss from grazing around the spring, and thus reduce erosion and improve productivity, the remainder of the pasture would be exposed to these impacts. Seasonal restrictions would reduce such impacts. Impacts would localized and range from minor to moderate.

Impacts from fire and fuels treatment efforts to soil resources would be similar to that described under Alternative A, although maximum acreage limits would be set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative C would result in more or less acreage being treated than under Alternative A, making comparing the impacts to soils difficult. More acres would be treated and treatment methods used compared to Alternatives B, resulting in more, short-term impacts to soils but less potential for indirect, longer-term impacts if more treatment efforts would result in less risk of catastrophic fire. This impact would range from minor to moderate.

Impacts from Soil, Air, and Water

Impacts would be the same as described under Alternative B.

Impacts from Special Status Species

In the Monuments, impacts would be the same as described under Alternative B. In the Arizona Strip FO, impacts from the management of special status species habitats would be similar to that proposed under Alternative A, including impacts from restoration activities, restrictions placed on various surface disturbing activities, and retaining lands in federal ownership. There would be some additional restrictions on surface disturbing activities from fire management, grazing, recreation, and development of facilities in special status species habitats that would provide additional protection to soils within those habitats compared to Alternative A, although there would be fewer or less intense restrictions than under Alternative B. Impacts would be minor and site specific. In addition, ACEC management restrictions would cover a greater area than under Alternative A, which would protect more acres of soil, but much fewer acres when compared Alternative B. Overall impacts to soils would be minor, long term, and site specific.

Impacts from Wild Horses and Burros

Impacts would be the same as described under Alternatives A.

Impacts from Minerals (Arizona Strip FO only)

The types of impacts from mineral management in the Arizona Strip FO would be similar to those described under Alternative A since the amount of acres closed to fluids mineral leasing and withdrawn to mining location would be similar. Roughly, nine thousand more acres would be designated closed to mineral material disposal compared to Alternative A, which would result in fewer impacts to soils, but more impacts compared to Alternative B.

Impacts from Livestock Grazing

The overall impacts from livestock grazing would be similar to those described under Alternative A. In Parashant, impacts from restrictions placed on the Mosby-Nay Allotment would be similar to Alternative B, although not as extensive. The season of use would be shorter for the Pakoon Springs and Pakoon allotments compared to Alternative A, reducing impacts to soils in these allotments compared to Alternative A, but involve more impacts compared to Alternative B. In Vermilion, specific impacts to the Lees Ferry Allotment would also be similar to Alternative A, although the allotment would be managed as a forage reserve and the season of use would be more restrictive, thus reducing the level of impact to soils. Impact would be minor. In the Arizona Strip FO, impacts from grazing in desert tortoise allotments and the Cedar Wash Allotment would be the same as described under Alternative A. Season of use and other management prescriptions may be applied to the portions of the Mesquite and Littlefield Community Allotments outside the Littlefield Slope pastures, which would have a negligible to minor impact on soils. Impacts to specific Southwestern Willow Flycatcher habitats would be the same as described under Alternative B.

Impacts from Recreation

Overall impacts to soils would be similar to those described under Alternative A, with a few exceptions. Under Alternative C, camping would be limited to existing sites or disturbed areas in the Monuments. This would limit the creation of new areas of compaction and erosion compared to Alternative A, although impacts would be more widespread compared to Alternative B. In the Arizona Strip FO, a motorized speed event area would be identified, which may limit the area of impact from such events as the Rhino Rally.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A in the Monuments. Impacts would be similar to that described under Alternative B in the Arizona Strip FO, although more impacts

to soils could occur due to an additional 1,638 acres being identified for disposal than identified in Alternative B or 131 acres more than Alternative A.

Alternative D

Impacts from Travel Management

Impacts would be similar to that described under Alternative C in the Monuments, including the potential for new road/trail construction and upgrades. Additional protection to soils would occur under Alternative D compared to Alternative A due to 148 miles of roads in Parashant and 93 miles of roads in Vermilion being be closed and rehabilitated (less than proposed under Alternatives B and C) and fewer miles of roads/tails open to the public (more than proposed under Alternatives B and C).

In the Arizona Strip FO, impacts from acres closed to motorized and mechanized vehicle use and route maintenance activities would be similar to Alternative B. Impacts from permanent motorized route and non-motorized trail construction and use of wheeled game carriers would be the same as under Alternative C. Alternative D would differ from the other alternatives in terms of having 7,186 acres of BLM land open to motorized and mechanized vehicle use, including one large area south of St. George and one small area south of Fredonia, nearly nine time the open acres proposed under Alternative A and nearly five times that proposed under Alternative C. Use of these areas would cause the greatest impacts to soils, especially south of St. George. Impacts would be localized, long term, and moderate. In addition, the greatest amount of new route and trail construction could occur under Alternative D to support recreation opportunities, which would lead to more impacts to soils than under Alternatives A, B, or C. Overall, the greatest impacts to soils from Travel Management would occur under Alternative D.

For the entire Planning Area, installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern would have the same impacts as described under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

Overall impacts to soils would be similar to those described under Alternative C. In Parashant, seasonal grazing of the Cane Spring Pasture of the Mud and Cane Allotment would be authorized, which would result in a similar impacts to soils in the area as Alternative A, but greater impacts when compared to Alternatives B and C. Repairing and maintaining the fence around the upper springs would help minimize direct impacts to soils in those springs.

Impacts from fire and fuels treatment efforts to soils would be similar to that described under Alternative A, although maximum acreage limits would be set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative D would

result in more or less acreage being treated than under Alternative A, making comparing the impacts difficult. More short-term impacts but potentially less long-term impacts would occur compared to Alternatives B and C due to more acres being treated and treatment methods being used. More, less, or similar impacts would occur compared to Alternatives E, depending upon the ecological zone. Impacts would range from minor to moderate.

Impacts from Soil, Air, and Water

Impacts would be the same as described under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B for the Monuments. In the Arizona Strip FO, impacts from the management of special status species habitats would be similar to that proposed under Alternative A, including impacts from restoration activities, restrictions placed on various surface disturbing activities, and retaining lands in federal ownership. There would be some additional restrictions on surface disturbing activities from fire management, grazing, recreation, and development of facilities in special status species habitats that would provide additional protection to soils within those habitats compared to Alternative A, although there would be fewer or less intense restrictions than under Alternative B or C. Impacts would be minor and site specific. The four original Siler pincushion ACECs designated in the 1992 RMP (Fort Pearce, Johnson Springs, Lost Springs, Moonshine Ridge) and the additional Clayhole ACEC would not be designated under this alternative. As a result, the protection to soils afforded by the ACEC designations would be lost. Impacts from the Marble Canyon ACEC and desert tortoise ACECs would be the same as under Alternative C. Also similar to Alternatives A is that no new ACECs would be designated under Alternative D, resulting in no added protection to soils that ACEC designations would provide. Impacts would be site specific, long term, and range from minor to moderate.

Impacts from Wild Horses and Burros

Impacts would be the same as described under Alternative A.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be similar to those described under Alternative A from the number of acres closed to fluids mineral leasing and withdrawn to mining location. However, Alternative D proposes the fewest acres designated closed to mineral materials disposal among the alternatives, resulting in the greatest potential for impacts to soils. Impacts would be minor and site specific.

Impacts from Livestock Grazing

Overall impacts would be similar to those described under Alternative A. In Parashant, season of use and other management prescriptions could be established in the Mosby-Nay, and Pakoon Springs Allotments, potentially reducing soil compaction/erosion in these allotments. Impacts would be negligible to minor. The portion of the Pakoon Allotment within the Pakoon DWMA (unavailable under Alternative A) would be open for grazing, which would make it susceptible to compaction and erosion. Impacts would be minor and site specific. In Vermilion, specific impacts to the Lees Ferry Allotment would also be similar to Alternative A, although it would be managed as a forage reserve. In the Arizona Strip FO, impacts from grazing in desert tortoise allotments would be similar to but more intense than that described under Alternative A due to the option to authorize ephemeral extensions, potentially increasing grazing by up to two months and creating the potential for greater impacts to soils in those allotments. Impacts to specific Southwestern Willow Flycatcher habitats would be the same as described under Alternative B.

Impacts from Recreation

Impacts would be similar to that described under Alternative C, with the exception that horse and stock use would be allowed in more portions of Paria Canyon, which would increase the total area impacted from trampling and erosion resulting from such use. Impacts would be minor.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A for the Monuments, but similar to Alternative C for the Arizona Strip FO.

Alternative E: Proposed Plan

Impacts from Travel Management

Impacts would be similar to what is described under Alternative C in the Monuments, including the use of wheeled game carriers and potential for new route construction and upgrades. Additional protection to soils would occur under Alternative E compared to Alternative A due to 188 miles of roads in Parashant and 113 miles of roads in Vermilion being be closed and rehabilitated (more than under Alternative D but less than under Alternatives B and C). In addition, fewer miles of roads would be open to the public, which would result in less impacts to soils compared to Alternatives A and D, but more when compared to Alternatives B and C.

In the Arizona Strip FO, impacts would be similar to those described under Alternative D, including those stemming from the number of acres open to motorized and mechanized vehicle use.

For the entire Planning Area, installing structures/barriers on routes to control unauthorized use, monitoring to detect routes caused by unauthorized use and then immediately obscuring and rehabilitating such unauthorized routes, and rerouting and reclaiming routes causing resource damage or with safety concern would have the same impacts as under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

Overall impacts to soils would be similar to those described under Alternative C. In Parashant, extensive site management of grazing and all associated facilities in the Riparian Pasture of the Mud and Cane allotment would help ensure protection and possible improvement of soils in the area, although surface-disturbing activities associated with trail facilities development may result in short-term impacts to soils.

Impacts from fire and fuels treatment efforts to soils would be similar to that described under Alternative A, although maximum acreage limits would be set. Since no maximum treatment acreage limits would be set under Alternative A, it is uncertain whether Alternative E would result in more or less acreage being treated than under Alternative A, making comparing the impacts difficult. More short-term impacts but potentially less long-term impacts would occur compared to Alternatives B due to more acres being treated and treatment methods being used, and less or similar impacts would occur compared to Alternatives C and D, depending upon ecological zone. Impacts would range from minor to moderate.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B for the Monuments. In the Arizona Strip FO, impacts form the management of special status species habitats would be similar to that proposed under Alternative A, including impacts from restoration activities, restrictions placed on various surface disturbing activities, and retaining lands in federal ownership. Impacts from additional restrictions on surface disturbing activities in special status species habitats would be similar to those described under Alternative D. Impacts would be minor and site specific. Impacts from the Siler pincushion cactus ACECs, the Virgin River ACEC, and designation of the Lone Butte, Black Knolls, and Kanab Creek ACECs would be the same as under Alternative B. Impacts from the Marble Canyon ACEC; desert tortoise ACECs, with the exception of the Virgin River ACEC; and not designating the Twist Hills, Clayhole, Buckskin, and Coyote Valley ACECs would be the same as described under Alternative C.

Impacts from Wild Horses and Burros

Impacts would be the same as described under Alternative A.

Impacts from Soil, Air, and Water

Impacts would be the same as described under Alternative B.

Impacts from Livestock Grazing

The overall impacts from livestock grazing would be similar to those described under Alternative A. In Parashant, impacts from lands available to grazing, unavailable to grazing, or with seasonal restrictions would be the same as under Alternative C or D, depending upon allotment. In Vermilion, such impacts would be the same as described under Alternative B. In the Arizona Strip FO, impacts from grazing in desert tortoise allotments would be the same as described under Alternative A. Impacts from grazing on the portions of the Mesquite and Littlefield Community Allotments outside the Littlefield Slope pastures and the Cedar Wash Allotment would be the same as under Alternative C. Impacts to specific Southwestern Willow Flycatcher habitats would be the same as described under Alternative B.

Impacts from Recreation

Overall impacts to soils would be similar to those described under Alternative C.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A in the Monuments, but the same as under Alternative C in the Arizona Strip FO.

Cumulative Impacts

The geographic area for analysis of cumulative impacts to soils is the Planning Area. The soils in the area formed under conditions that had no vehicles or large numbers of large animals to impact them. Population growth, grazing, and developments in the past 150 years have resulted in soil disturbance on hundreds of thousands of acres at and near homesteads, communities, roads, and waters in the Planning Area. Continued population growth and the resulting growth in vehicle and OHV use and visitation in the region would continue to add to the acreage of soil disturbance. Continued AMP implementation, watershed plans, and the Standards and Guides process would continue to examine livestock grazing areas for impacts and would apply remedies to decrease compaction and erosion. Continued and/or additional gypsum mining would increase disturbance to soils. Renewed exploration or production of uranium would increase soil disturbance on access roads and at mine sites. Reclamation would stabilize the replaced soils. Federal designations of wilderness and national Monuments and parks would continue to reduce roads, OHV use, and erosion. Additional droughts would reduce overall vegetative cover making soils more susceptible to erosion, especially where there is surface disturbance. Wildfire would continue to make soils more susceptible to erosion. The Fort Pearce Community Watershed Plan, the Upper Langs Run Watershed Management Plan, and the Fort Pearce Wash Salinity Control Plan would continue to control floods, reduce erosion, reduce downstream peak flow, protect microbiotic soils, and trap saline sediments.

GEOLOGY AND PALEONTOLOGY

This section presents potential impacts of the alternatives on geological and paleontological resources. Many of the well-known and spectacular or unique geological resources in the Planning Area are managed with other resources under Special Designations, such as wilderness areas, National Monuments, and ACECs. The locations of some less familiar geological resources, such as cave and karst resources, sink holes, lava tubes, and breccia pipes are lesser known. The Planning Area has not been surveyed for paleontological resources and the occurrences of most paleontological resources are not known. See Chapter 3 for a discussion of the geological and paleontological resources in the Planning Area.

Impacts to geological and paleontological resources occur by erosion, vehicles driving off roads, excavation, theft, vandalism, and surface disturbing activities such as trampling by animals and humans. Experience has shown that damage, theft, and vandalism are usually concentrated near roads and trails. Impacts to geological and paleontological resources may increase because of additional visitation to the Planning Area.

Methods and Assumptions

The analysis of potential impacts to geological and paleontological resources is based on the expertise of BLM resource specialists at the Arizona Strip FO and the NPS staff at Parashant and Lake Mead NRA. The impact analysis is also based on review of existing literature, geologic maps, field trips, site visits, and information provided by non-planning team experts in the BLM, NPS, USGS, and other agencies.

Specific impacts on geological resources are not always readily identifiable. This is because some impacts on geology are difficult to separate from impacts to other resources that geology supports. Thus, the impacts on geology are often discussed, either implicitly or explicitly, in the discussion of impacts to other resources such as paleontology and scenic quality (Visual Resources).

Paleontological resources are associated with specific geologic formations. Appendix 3.B is a summary table of the fossil assemblages associated with each geologic formation, group, and member in the Planning Area. No vertebrate fossil remains have been documented in the Planning Area. However, vertebrate fossil remains are found adjacent to the Planning Area within many of the same geologic formations present in the Planning Area. Fossil vertebrate footprints (ichnites) are documented in the Planning Area.

All surface disturbing activities include mitigation to reduce impacts to geological and paleontological resources. Analysis of impacts includes all mitigation measures in place.

Effects are quantified where possible. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in

qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: The impact to geological or paleontological resources would not be detectable through standard observation. The effect would be at the lowest levels of detection, barely measurable, and without any perceptible consequences, either beneficial or adverse.

Minor: The impact would be detectable. The beneficial or adverse impact would be measurable or perceptible, but it would be slight and localized within a relatively small area. The total volume of disturbance or damage to geological and paleontological resources would be hardly perceptible.

Moderate: The impact would be readily apparent beneficial or adverse. The impacts would be measurable and perceptible. Adverse actions would change one or more character-defining features of a geological and paleontological resource, but would not diminish the integrity of the resource to a large extent. The total volume of disturbance could still be small, but quite noticeable in local areas, or it could involve a unique or rare resource.

Major: The impact would be severe. The adverse impact on geological and paleontological resources would be substantial, noticeable, and permanent. Actions would result in a dramatic change to the resource. The change would be measurable and the amount of disturbance would be large.

The area of analysis for cumulative effects on geological and paleontological resources is defined as northern Arizona, southwestern Utah, and southeastern Nevada.

Impacts to Geology and Paleontology

Impacts to geological or paleontological resources in Parashant would result from actions proposed under the following resource management programs:

- Travel Management
- Wilderness Characteristics
- Vegetation and Fire and Fuels Management
- Visual Resources
- Minerals (Arizona Strip FO only)
- Special Designations
- Recreation
- Lands and Realty

Alternative A: No Action

Impacts from Travel Management

To protect Monument objects identified in the proclamations, including geological and paleontological resources, no areas within the Monuments would be authorized for cross-country, off-road vehicular use except for authorized administrative and emergency purpose. Enforcing this action would reduce erosion, trampling, vandalism, and other surface disturbing impacts that damage geological and paleontological resources. Restricting travel to designated roads would confine physical disturbances to geological and paleontological resources to the area in the immediate vicinity of the designated roads.

The most miles of roads would be open to motorized and mechanized travel under this alternative, along with the fewest miles of roads closed to motorized and mechanized travel. Road closures could also affect research by limiting access. The most impacts to geological and paleontological resources associated with motorized and mechanized travel along roads would occur under this alternative. Overall impacts to geological and paleontological resources would be minor.

In the past, visitors have created roads and repeated use has made them permanent. These unapproved roads could be destructive to geological and paleontological resources. Implementing Alternative A would minimize new, permanent roads within the Planning Area, which would protect geological and paleontological resources from further damage. Direct and indirect impacts to geological and paleontological resources would be minor to moderate.

Impacts from Wilderness Characteristics

Under Alternative A, no acres would be allocated for the maintenance of wilderness characteristics.

Impacts from Vegetation and Fire and Fuels Management

In general, impacts to geological and paleontological resources would be negligible due to minimal vegetation treatments proposed under Alternative A.

In Parashant and the Arizona Strip FO, wildland fire use and prescribed fire would continue and could cause direct and indirect impacts to geological and paleontological resources. Fire could cause the direct destruction of organic fossil remains (e.g., Quaternary packrat middens). The removal of vegetative cover by fire would accelerate erosion and aeolian processes creating short-term indirect impacts. However, these impacts would be negligible compared with similar impacts that occur by natural processes. Fire suppression that involves the use of heavy

equipment and the construction of fire lines creating surface disturbances could cause direct minor impacts to geological and paleontological resources.

Since wildfires tend to be confined to singletree events in Vermilion, there would be no or negligible impacts to geological and paleontological resources in that Monument.

Impacts from Visual Resources

For Parashant and the Arizona Strip FO, Alternative A would involve the most acreage designated as Visual Resources Management (VRM) Class IV compared to the other alternatives, resulting in the greatest potential to disturb the geological strata, paleontological resources, and the view of the area's geology. Overall impacts could range from negligible to moderate. For Vermilion, all proposed VRM designation is either Class I or Class II, which could help preserve the Monument's geology and paleontology.

Impacts from Minerals (Arizona Strip FO only)

Surface disturbing activities authorized by the minerals programs, such as mineral exploration projects and extraction of mineral resources, could result in adverse direct and indirect impacts to geological and paleontological resources. The impacts would be minor to moderate.

Impacts from Special Designations (Arizona Strip FO only)

Designation of ACECs to protect critical resources would also benefit geological and paleontological resources by requiring a plan of operations for mineral development and allowing no cross-country motorized travel. Impacts would be minor.

Impacts from Recreation

Recreation under Alternative A would maintain emphasis on recreation opportunities associated with motorized vehicle use such as exploring backcountry roads, vehicle camping, sightseeing, and picnicking. Increased visitation under current management would increase surface disturbance and opportunities to directly and indirectly damage resource such that minor impacts could occur to the geological and paleontological resources.

In Arizona Strip FO, greater impacts would occur during competitive events, such as motorized vehicle races and rallies. In the short term, minor impacts would be evident to the geological and paleontological resources; however, moderate impacts could result in the long term.

Impacts from Lands and Realty

Lands and realty actions could result in the acquisition of surface and subsurface estate, which would bring the estate under the federal protection and benefit geological and paleontological resources.

Land disposed in the Arizona Strip FO could be detrimental to geological and paleontological resources depending upon the use of the land after leaving federal ownership. Withdrawals restrict certain activities including access, which decreases visitation. This would indirectly benefit geological and paleontological resources since fewer visitors would result in less surface disturbance and fewer opportunities to damage resources. The impacts would be minor.

Surface disturbing activities authorized by the lands and realty programs, such as ROWs and communication sites, could result in adverse direct and indirect impacts to geological and paleontological resources. The impacts could be minor to moderate.

Alternative B

Impacts from Travel Management

Under Alternative B, the least miles of routes within the Planning Area would be open to motorized use, which are 1,381 less than the miles that proposed under Alternative A. In addition, the most miles of routes would be closed to motorized and mechanized access. This makes Alternative B the most restrictive for motorized/mechanized access, which would result in reduced opportunities for visitors to cause surface disturbances from motorized use, and thus reduce damage to geological and paleontological resources from such use. Road closures, however, could affect research proposals by limiting access. Direct and indirect impacts would be negligible to minor.

Impacts from Wilderness Characteristics

Alternative B recognizes the most acreage for wilderness characteristics in the Monuments. In the Arizona Strip FO, 46,135 acres would be identified to maintain wilderness characteristics. The emphasis on naturalness and a focus on reduced motorized visitation within these areas would be beneficial for geological and paleontological resources. Indirect impacts would be negligible to minor.

Impacts from Vegetation and Fire and Fuels Management

Overall impacts would be the same as described under Alternative A.

Impacts from Visual Resources

Alternative B proposes the greatest amount of acreage to be designated as VRM Class I and II, with the least amount of acreage to be designated as VRM Class III and IV compared to the other alternatives, which would provide the greatest protection of geological and paleontological resources. Impacts would be negligible to minor.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Impacts from Special Designations

The existing ACECs in Parashant would lose their designation under Alternative B, with no new ones being created. Impacts would be negligible as Monument status currently provides similar protection to geological and paleontological resources as afforded by ACEC designation. In the Arizona Strip FO, Alternative B proposes most acreage for ACEC designation, over twice as many acres compared to Alternative A, which would provide the most protection to geological and paleontological resources than under any other alternative. Impacts would be minor.

Impacts from Recreation

Under Alternative B, motorized recreational activities such as driving for pleasure, OHV exploration, geocaching, and dispersed camping would be limited, potentially reducing such activities or limiting the area in which they occur. This would reduce opportunities to create surface disturbances and damage to geological and paleontological resources. Direct and indirect impacts would be minor.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A.

Alternative C

Impacts from Travel Management

Under Alternative C, significantly fewer miles of routes would remain open for motorized and mechanized use by the public than under Alternative A, but more would be open than under Alternative B. Impacts would be similar to those discussed under Alternative B, but less intense. Direct and indirect impacts would be negligible to minor.

Impacts from Wilderness Characteristics

In the Monuments under Alternative C, approximately half as many wilderness characteristics acres would be maintained than under Alternative B. The types of impacts would be the same as described under Alternative B, although less intense due to the reduced number of acres proposed. Impacts would be minor.

In the Arizona Strip FO under Alternative C, almost twice as many acres are proposed to maintain wilderness characteristics compared to Alternative B, the most among the alternative. Impacts would be similar to that described under Alternative B, except that they would be more widespread. Impacts would be minor.

Impacts from Vegetation

Impacts would be the same as described under Alternative A.

Impacts from Visual Resources

Under Alternative C, more acreage would be designated VRM Class III than under Alternative A and less acres would be designated VRM Class IV. This would provide more protection to geological and paleontological resources than under Alternative A, but less protection compared to Alternative B. Impacts would be minor.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be similar to those described under Alternative A.

Impacts from Special Designations

Impacts would be the same as described under Alternative B for Parashant and similar to that described under Alternative A for the Arizona Strip FO, albeit slightly more widespread as roughly 5,000 more acres would be under ACEC protection.

Impacts from Recreation

Under Alternative C, motorized recreational activities such as driving for pleasure, OHV exploration, geocaching, and dispersed camping would be less limited than under Alternative B. There would still be a reduction in motorized vehicle use, and consequently reduced opportunities to create surface disturbances and damage to geological and paleontological resources when compared to Alternative A. Direct and indirect impacts would be minor.

In the Arizona Strip FO, impacts resulting from competitive events would also be similar to those described under Alternative A.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A.

Alternative D

Impacts from Travel Management

Under Alternative D, almost as many miles of routes would remain open to motorized and mechanized use as under Alternative A. Overall, Alternative D is the least restrictive alternative in terms of OHV use and would thus result in more localized impacts from such use than the other alternatives. Opportunities for motorized and mechanized vehicle impacts would be greater compared to Alternatives B and C. Road closures could affect research proposals by limiting access but not as much as under Alternatives B and C. The direct and indirect impacts would be minor to moderate.

Impacts from route maintenance/improvement activities would be the same as described under Alternative B. Overall, direct and indirect impacts to geological and paleontological resources would be negligible to minor.

Impacts from Wilderness Characteristics

Under Alternative D, the fewest acres would be identified to maintain wilderness characteristics among the action alternatives. The types of impacts would be the same as described under Alternative B, but greatly reduced due to the limited number of acres.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative A.

Impacts from Visual Resources

Impacts would be similar to those described under Alternative C.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Impacts from Special Designations

Impacts would be the same as described under Alternative B for Parashant. In the Arizona Strip FO, the least amount of acreage for ACEC designation is proposed under this alternative. This would result in less protection to geological and paleontological resources compared to the other alternatives. Impacts would be minor.

Impacts from Recreation

Under Alternative D, fewer limits would be placed on motorized recreational activities (e.g., driving for pleasure, OHV exploration, geocaching) compared to Alternatives B and C. This would increase the potential for impacts to geological and paleontological resources. Management of proposed Special Recreation Management Areas (SRMAs) would continue to provide protection to geological and paleontological resources. Direct and indirect impacts would be minor.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A.

Alternative E: Proposed Plan

Impacts from Travel Management

Under Alternative E, approximately 80% of the miles of motorized and mechanized routes would remain open when compared to Alternative A, with more miles being closed. This would reduce opportunities to create surface disturbances that could damage geological and paleontological resources when compared to Alternatives A and D, but not as much when compared to Alternatives B and C. Road closures could affect research proposals by limiting access, but not as much when compared to Alternatives B and C. The direct and indirect impacts would be minor to moderate.

Impacts from Wilderness Characteristics

Impacts would be similar to Alternative C in the Monuments due to similar number of acres being identified to maintain wilderness characteristics, while impacts would be similar to Alternative D in the Arizona Strip FO.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative A.

Impacts from Visual Resources

Under Alternative E, acreage designated VRM Class I & II would be 15% less than Alternative B, providing a high degree of protection of geological and paleontological resources. Impacts would be similar to those described under Alternative B.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Impacts from Special Designations

Impacts would be the same as described under Alternative A.

Impacts from Recreation

Impacts would be similar to those described under Alternative D.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A.

Cumulative Impacts

Possibly the most significant cumulative impact to geological and paleontological resources in the foreseeable future would be from vandalism. Many of the spectacular or unique geological resources are protected under Special Designation, such as wilderness areas or National Monuments. As the popularity of these locations increases, so would visitation. Stronger protective measures could be needed to prevent vandalism.

Marking rock exposures with graffiti has occurred in the past. Carving letters or pictures into geologic exposures is expected to occur into the future. Unauthorized OHV use could also substantially impact these resources.

On the Arizona Strip FO, important invertebrate fossils are relatively unknown and vertebrate remains have not been reported. Fossil vertebrate footprints (ichnites) are documented, but their exact locations are not general public knowledge. These resources need to be inventoried. Maintaining open communication with paleontologists including those associated with colleges and universities, organized groups, and professionals could be critical in the protection of these resources.

VEGETATION

Vegetation is a fundamental and vitally important component of the biological resources in the Planning Area. The effects on vegetation resulting from implementing any of the alternatives under consideration would also affect other resources. Impacts to the vegetation resource could result in reduced biological productivity, weed invasion, and unwanted changes in the composition and structure of vegetation communities. These changes, in turn, could influence forage availability for wildlife and livestock. Where actions result in loss or reduction of vegetative cover and/or soil erosion or compaction, archaeological, paleontological, historic, wildlife, water, soil, and air resources could be impacted.

The direct and indirect effects of management actions or uses of vegetation resources may vary widely, depending on a variety of factors such as the type of soils, soil moisture, topography, and plant reproductive characteristics. Direct impacts are generally caused by any construction activities; the establishment, use, maintenance, closing, or rehabilitation of roads and trails; herbivory and livestock trampling; fire ignitions and suppression actions, including blading of fire lines; manual, chemical, mechanical, and biological vegetation treatments, as well as by seeding; and the introduction, spread, and treatment of noxious and invasive weeds. Indirect impacts are generally caused by dust accumulation immediately adjacent to roads and would include lowered vigor or death of plants; changes in plant abundance and/or species composition resulting from modified nutrient cycling due to soil compaction, the accumulation of urine and feces, and soil erosion or deposition associated with livestock; and nutrient modification and soil loss or deposition associated with fire.

Methods and Assumptions

The analysis of potential impacts to vegetation resources is based on the expertise of BLM resource specialists at the Arizona Strip FO and the NPS staffs at Parashant and Lake Mead NRA. Combined, these staffs possess an extensive knowledge of the vegetation resources within the Planning Area. The impact analysis is also based on review of existing literature and information provided by non-planning team experts in the BLM, NPS, and other agencies. The following categories were used to evaluate intensity of the potential impacts on vegetation.

Negligible: Generally, negligible impacts are not quantifiable, and therefore not analyzed.

Minor: The action would affect some individual native plants and a relatively minor portion of the plant community. The use of standard operating procedures to offset adverse impacts, including special measures, would be required and would be effective.

Moderate: The action would affect numerous individual native plants and a sizeable segment of the native plant community over a relatively large area. The use of standard operating procedures to offset adverse impacts, including special measures to

avoid affecting special status plants, animals, and important cultural resources, could be extensive, but would probably be successful.

Major: The action would cause a considerable effect on native plant populations, and the effects would cover a relatively large area. The extensive use of standard operating procedures to offset the adverse effects would be necessary, and their success would not be guaranteed.

Impacts to Vegetation

Impacts to vegetation resources would result from actions proposed under the following resource management programs:

- Travel Management
- Vegetation and Fire and Fuels Management
- Air, Water, and Soil Resources
- Fish and Wildlife
- Special Status Species
- Visual Resources
- Mineral Resources (Arizona Strip FO only)
- Livestock Grazing
- Recreation
- Lands and Realty

Alternative A: No Action

Impacts from Travel Management

Vehicles traveling on roads in the transportation system would deposit dust on individual plants. This could lead to a decrease plant vigor and increase mortality alongside the road. Dust settling on vegetation adjacent to roads would also reduce habitat suitability. Impacts would be minor, indirect, and both short and long term. Under this alternative, 7,095 miles of routes would be open to motorized use, including 1,715 in Parashant, 446 in Vermilion, and 4,934 in the Arizona Strip FO. As a result, the magnitude of impacts would be greater than under any other alternative.

The construction of new, temporary roads to facilitate project implementation would result in moderate short-term direct impacts to vegetation resources along the construction path. Rehabilitation of closed or temporary roads where use is no longer required would have moderate short- and long-term direct and indirect impacts, depending upon the habitat and the closure method. Long-term impacts would result in areas of low rainfall where regeneration is slow. Direct impacts would include injury or loss of vegetation from crushing. Indirect effects would include dust, erosion, soil compaction, and watershed impacts resulting from the

rehabilitation process. Long-term positive effects would occur as vegetation became reestablished.

Impacts from Vegetation and Fire and Fuels Management

Restoration and Vegetation Treatments: Impacts would vary by the method used to accomplish the treatment, whether manual, mechanical, chemical, biological, or fire. Vegetation treatment methods are described in Appendix 2.C.

Vegetation treatments are designed to move plant communities towards desired future conditions (DFCs). Not implementing these treatments would inhibit or prevent attainment of ecological objectives and DFCs. Where fuel loads are excessive, failure to conduct vegetation treatments would increase the risk of catastrophic fire, which would put tens of thousands of acres at risk of vegetation loss. Catastrophic fire would also cause major, long-term indirect impacts in terms of wildlife habitat loss and long-term or permanent reduction in biomass productivity from erosion.

Vegetation treatments are designed to change vegetative composition and diversity from one state to another. As a result, most treatment methods initially remove some or all of the surface vegetation. This results in reduction of ground cover and increased erosion. Depending upon the method used, there may also be varying levels of surface disturbance, particularly with mechanical treatment methods. Since germination is highest where seeds are covered by soil and protected from erosion, and where moisture is held, treatment methods that disturb soils often have higher success rates compared to those methods that do not disturb soils. Successful treatments would increase ground cover and vegetative diversity, which would provide soil stability, reduce soil surface temperatures, increase water holding capability, and increase food and cover for wildlife.

The greatest level of environmental impact occurs when a vegetation treatment fails. A vegetation treatment is considered a failure when the existing vegetation is not removed and/or the target vegetative community does not become established. When the existing vegetation remains at the site, the environmental consequences are minimal. However, when the treatment is successful in removing existing vegetation, but the desired future vegetative community does not become established, a variety of consequences can result. In such cases, mechanical and other surface disturbing treatment methods can lead to increased erosion as effective ground cover would be greatly reduced. Increased invasion of noxious weeds and other exotic weed species, decreased water availability, and long-term changes in habitat and species composition could occur. The duration of these effects would vary by treatment method, habitat and community type, availability of appropriate seed, and amount and timing of precipitation. Most such failed treatments would eventually be revegetated by either the former plant community or some new and perhaps less desirable community.

Because of the dynamic nature of vegetative communities, even those areas where seedings are unsuccessful would eventually become filled in with vegetation. Treatment areas change over time as vegetation is re-established. Some areas treated early in the planning cycle would become completely re-vegetated and could conceivably require treatment maintenance prior to the next planning cycle. Failed treatments would not be considered permanently "lost" from the system unless the site became re-established with a highly stable, non-target plant community. Treatment methods that proved to be unsuccessful at achieving the desired results would be modified or discontinued. Since most treatments require at least two growing seasons to determine success, it is unlikely that unsuccessful methods would be used for more than two consecutive years. As a result, the potential for failed treatments to occur on the maximum number of acres available for treatment is considered negligible. Assuming two different treatment methods were completely unsuccessful and resulted in stable, non-target plant communities, no more than 20 percent of the maximum treatable acreage could be permanently lost over the life of the plan. Use of adaptive management should reduce or eliminate the potential for permanent loss of desired vegetation communities from treatments.

Manual Vegetation Treatments: Compared to other methods, manual treatments would have minimal effects to sensitive habitats by retaining more vegetation of non-target species and result in a lower likelihood of erosion, soil instability, sedimentation, or increased surface temperatures. Impacts would be direct and minor.

Mechanical Vegetation Treatments: Use of mechanical tools would reduce canopy cover, increase plant diversity on the forest floor, increase soil moisture due to the reduction of evapotransporation, and change habitat type. These impacts would be direct, both short and long term, and positively affect some species while negatively affecting others. Long-term, indirect impacts would result from changes in habitat type resulting from the changes in forest density, canopy cover, structure, and the protection and maintenance of forest habitats. Mechanical treatment methods could also result in localized, short-term impacts to air quality from fugitive dust, equipment emission/exhaust, and chemical fumes, which, in turn, could lead to reduced plant vigor and fitness, or mortality among individuals or species.

Biological Vegetation Treatments: Target species would experience direct, short-term impacts due to biological vegetation treatments. Depending upon the biological control agent, a variety of other direct and indirect effects could occur, including mortality of non-target species. As with other vegetation treatment methods, indirect effects would include reduced soil infiltration, increased erosion and sedimentation, increased soil surface temperatures, and short- or long-term changes in species composition and/or community structure.

Chemical Vegetation Treatments: Target and some non-target species would experience direct, short-term impacts, depending upon the chemical used and the application rate. Indirect effects would include reduced soil infiltration, increased erosion and sedimentation, increased

soil surface temperatures, and short- or long-term changes in species composition and/or community structure. Direct and indirect effects from the use and application of specific chemicals is described in detail in the FEIS for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991a), as well as the draft revision of the document (BLM 2005).

Prescribed Fire, Fire Use, and Management: The intensity of impacts from prescribed fire and fire use depends on the size and intensity of the fire, as well as fuel type and quantity. Impacts from fires that cause injury or loss of individual plants and an increase in soil moisture due to the reduction of evapotransporation would be short term and minor. Impacts from fires that change species composition, plant density, and vegetative structure, and increases the abundance of non-native invasive, fire-adapted plant species would be direct, major, and both short and long term. Reduction in biomass productivity due to accelerated erosion resulting from the reduction in effective ground cover, as well as reduced habitat suitability for seed dispersers, would represent indirect, major impacts.

Fire Suppression: Direct impacts from the removal of vegetation from hand-line construction would be short term and minor. Impacts from using aerially-applied retardant as an alternative to hand-line construction would be negligible. Most impacts from fire suppression activities would be minor, short-term, and localized, particularly if activities in sensitive habitats are mitigated or avoided. Impacts in the arid desert-scrub communities may be longer term since these vegetation communities do not recover as readily.

Control of Noxious Weeds: Impacts depend upon the method used. Direct impacts to the target species from manual techniques and herbicide applications would range from minor to moderate, with some non-targets experiencing impacts in the short-term. Eradication of noxious weed species and improved species composition for the remaining community would occur over the long term.

Collection and Use of Native Seed/Use of Non-native plants: In Parashant and the Arizona Strip FO, collection and use of native seed could be authorized with a permit. Collection of native seed could result in localized, minor short-term impacts to vegetation from trampling, loss of individuals, reduction in seed availability at the collection site, and potential reduction in plant vigor. The availability of local native seed would result in moderate indirect long-term impacts, which include improved ability to achieve DFCs by improving the species composition in areas needing vegetation treatments. Collection of native seed would not be authorized in Vermilion.

Assuming criteria described in Chapter 2 are met on BLM lands, non-native plant species could be used in treatment/restoration efforts. The major short-term direct impact from the use of nonnative plant species is the stabilization of soils following disturbance when native species are ineffective, cannot be established, or are not available. The major short and long-term indirect impacts from use of nonnative plant species for re-seeding would be an undesirable change in species composition, resulting from introducing species that could out-compete natives and/or increase the frequency or intensity of wildfire.

Vegetation Products Use/Sale: On NPS lands in Parashant, use and sale of vegetation materials cannot be authorized unless as part of a science-based ecological restoration project. On BLM lands in Parashant, use and/or sale of vegetation products would have localized, minor to moderate impacts on vegetation resources. Indirect effects would include reduced soil infiltration, increased erosion and sedimentation, increased soil surface temperatures, and short- or long-term changes in species composition and/or community structure. Impacts resulting from fuelwood harvest associated with restoration projects could lead to long-term or permanent changes in vegetative community structure or dynamics.

The use and/or sale of vegetation products would not be authorized in Vermilion. Impacts from free and non-commercial use of these products would be similar in scope and extent to those described for Parashant.

In the Arizona Strip FO, the use and/or sale of vegetation products, particularly harvest of fuelwood associated with restoration projects, post cutting, collection of dead and downed wood for campfires, Christmas tree harvest, and collection of pinyon nuts, would have localized, minor to moderate impacts on vegetation resources. Indirect effects would include reduced soil infiltration, increased erosion and sedimentation, increased soil surface temperatures, and short or long-term changes in species composition and/or community structure. Impacts resulting from fuelwood harvest associated with restoration projects could lead to long term or permanent changes in vegetative community structure or dynamics. Salvage of vegetation that would be destroyed through surface disturbing activities would not be authorized in the planning area under this alternative.

Impacts from Air, Water, and Soil Resources

Direct impacts from soil stabilization and reclamation projects that reestablish native vegetation on the disturbed area would be both short and long term. Indirect impacts would include increased effective ground cover, reduced erosion and compaction, and increased infiltration, which could become long term due to increased vegetation productivity and improved wildlife habitat and connectivity. All impacts would be minor.

Construction of water retention structures would directly increase sheet erosion and reduce gully and rill erosion. These impacts would be short term and minor. The area of disturbance would vary by the action proposed, but generally would average less than five acres per structure.

Impacts from Fish and Wildlife

Implementation of habitat management plans (HMPs) which specify vegetation treatments to improve habitat would involve removing individual plants and altering species composition and vegetation structure. Impacts would vary by treatment method used (see discussion above on Impacts from Vegetation Resources)

Direct impacts due to foraging by newly transplanted big game animals may be long term and minor. Transport methods could introduce sources of noxious weeds.

Constructing new water developments would permanently remove vegetation within the footprint of the structures. Impacts would be direct, long term, and minor. Surrounding vegetation could be injured or damaged temporarily, but would likely recover. Increased use of the area by wildlife species not previously present would increase foraging pressure on desirable species. This could result in increased or decreased vigor to the plants depending upon the species and their phenology. Water from the development may leak or spill, resulting in short- or long-term changes in vigor and/or species composition. On average, the disturbance area for each water development is two acres. In Parashant under Alternative A, as many as 20 new wildlife water developments would be built within the life of this Plan, which could permanently alter vegetation resources on up to 40 acres. Maintenance of existing water developments would result in minor disturbance impacts to vegetation resources similar in scope and nature to those described for new developments. Each year, approximately 10 wildlife water developments would be inspected and maintained in Parashant.

In Vermilion, as many as six new wildlife water developments could be built throughout the life of this Plan, which would result in approximately 12 acres of vegetation resources being permanently altered. In addition, six or more wildlife water developments each year would inspected and maintained in during the life of the Plan in Vermilion, which would result in similar disturbances to vegetation resources as described for new developments.

In the Arizona Strip FO, as many as 20 new wildlife water developments would be built throughout the life of this Plan, which would result in approximately 40 acres of vegetation resources being permanently altered. Approximately 30 wildlife water developments would inspected and maintained each year during the life of this Plan in the Arizona Strip FO, which would result in similar disturbances to vegetation resources as described for new developments.

In Parashant, increased visitation resulting from the management of the Mt. Trumbull Watchable Wildlife area would directly affect vegetation in the area due to disturbance, trampling, and compaction. Impacts would be minor and both short and long term. The latter would occur due to reduced biomass productivity caused by compaction.

Impacts from Special Status Species

Impacts from special status species transplants would be similar to those described for transplants of wildlife species in the above section, Impacts from Fish and Wildlife.

Restrictions on vegetation treatments in special status species habitats (e.g., desert tortoise or special status plants) would reduce or eliminate potential impacts to vegetation from treatment projects. Impacts would vary with the type of treatment proposed and the nature and extent of

the restrictions. Failure to implement vegetation treatments in these habitats could result in direct and indirect, long-term impacts to vegetation, especially treatments to control noxious weeds.

Restricting authorized uses for special status species would reduce or eliminate disturbances that would otherwise have affected vegetation. Impacts would be direct, long term, and minor.

Closing and rehabilitating roads used in restoration efforts would increase plant vigor and reduce mortality alongside the road by reducing dust on individual plants. Impacts would be indirect, minor, and both short and long term. Compaction would also be eliminated along the closed/rehabilitated route, which would increase infiltration, reduce erosion, and ultimately improve ground cover, causing a further reduction in erosion, increase in biomass productivity and vegetative structure, and an improvement in wildlife habitat attributes. These impacts would be indirect, long term, and major.

Impacts from Visual Resources

Implementing VRM guidelines would increase the difficulty of accomplishing vegetation management actions and limit the extent and/or effectiveness of the restoration efforts. Vegetation treatment projects would generally not occur in VRM Class I areas, which would cover about 13 percent of the Monuments under Alternative A. Vegetation treatment, restoration, and weed treatment projects on 41 percent of the Monuments within VRM Class II areas could be redesigned, moved, or otherwise restricted. See discussion on restoration and vegetation treatments in the Impacts from Vegetation and Fire and Fuels Management section above for a discussion of impacts.

Impacts from Minerals (Arizona Strip FO only)

In the Arizona Strip FO, impacts to vegetation resources could result from locatable mineral development, oil and gas development, and/or mineral material sales/disposal. Impacts associated with these actions would include loss or injury of plants due to excavation or trampling, burial under piles of waste material, toxic responses from use of chemicals in mineral extraction or waste pits, and increased exposure to dust and other contaminants associated with construction and use of access roads. In the worst-case scenario, all vegetation would be removed from a parcel of land and the site would be permanently altered so as to prevent future vegetation growth. This represents minor to moderate long-term impacts depending upon the size and location of the parcel and the occurrence of rare plant species. Parcels that include listed threatened, endangered, or proposed species would be subject to consultation with the U.S. Fish and Wildlife Service (USFWS).

Reasonably foreseeable development scenarios for mineral exploration and development are provided in Appendix 4.B. These scenarios were developed based on past mining activities and specific assumptions described in the Appendix. Reasonable estimates for future exploration and

development are provided. Estimates of the number of acres disturbed by implementation of the reasonable foreseeable development scenarios are provided by the ecological zone affected.

Leasable Minerals: In general, approximately 7 acres are disturbed per well during oil and gas drilling operations. No economic development or production of fluid minerals occurred in the Planning Area during implementation of the 1992 RMP. On average, one Application for Permit to Drill (APD) has been received per year for the Planning Area. Assuming this remains consistent throughout the life of this Plan (i.e., over the next 20 years), the total area of related disturbance would be approximately 140 acres. The majority of this disturbance would occur in the Great Basin - Sagebrush Ecological Zone, the Plains-Grassland Ecological Zone, or a combination of the two. If reclamation were completed immediately following drilling and full re-vegetation takes 10 years, the maximum area disturbed at any one time would be 70 acres.

Locatable Minerals: It is anticipated that 720 acres would be exposed to surface disturbance from locatable mining development over the life of this Plan: 120 acres from uranium mines in the area of Kanab Creek in the Plains-Grassland Ecological Zone and 600 acres from gypsum mines in the St. George Basin in the Mojave Ecological Zone outside of desert tortoise habitat.

Mineral Materials: The total area impacted by the disposal of mineral materials is approximately 200 acres. It is anticipated this figure could double over the next 20 years and the total disturbance from mineral material disposal would reach approximately 400 acres.

Impacts from Livestock Grazing

Livestock grazing can directly affect vegetation by reducing plant vigor, decreasing or eliminating desirable forage species, increasing soil instability and erosion, reducing water quantity and quality, and losing or injuring individual plants from trampling, particularly near water developments. Impacts would be both short and long term and range from minor to major, depending upon the grazing intensity, duration, and season of use, and local climatic conditions. Long-term changes in vegetation may result if livestock use consistently exceeds established allocations, or drought or other environmental factors reduce range carrying capacity. Over grazing may lead to soil compaction, reduced infiltration rates, increased runoff and erosion, and declines in watershed condition. Livestock grazing may also increase the opportunity for exotic plant species and noxious weed infestations. Season of use restrictions may lessen the effects of grazing, particularly if grazing occurs during the non-growing season.

Under Alternative A, five allotments would be subject to being unavailable for grazing in Parashant and the Arizona Strip FO, which would prevent livestock from grazing on 199,350 acres, indirectly affecting vegetation in these areas over the long term. Impacts would range from minor to moderate as vegetation in these areas may or may not regenerate, depending upon the timing and duration of grazing and the extent of long-term changes in species composition, localized erosion, and soil compaction.

Managing the BLM portion of the Parashant Allotment as a forage reserves would have similar impacts to those described above for livestock grazing, except that grazing would occur less frequently. Livestock and permittees would be less familiar with the location of waters, forage areas, and other developments, resulting in more widespread, but less intensive impacts.

Construction or maintenance of range water developments would have similar impacts to those described above for wildlife water developments. Water developments concentrate livestock use and reduce or eliminate vegetation in the immediate vicinity and increase compaction and erosion, which would lead to decreased biological productivity. For a typical reservoir or catchment, such impacts would occur within six acres, on average, though effects may be noticeable within a radius of one-quarter mile from the water development. Impacts would be minor and long term. As many as 30 new range water developments could be built over the life of this Plan, resulting in impacts on 180 acres. Abandonment or removal of watering facilities would result in minor long-term indirect impacts to vegetation. As the biomass of vegetation increases the effective ground cover increases, erosion decreases, and infiltration would increase. Maintenance of the 639 existing range water developments in Parashant and the Arizona Strip FO would have similar impacts to those described above for maintenance of artificial water sources. Most, if not all, of the existing waters would be inspected at least once over the life of this Plan. As many as 100 of these waters could be repaired, rebuilt, or replaced.

In Vermilion, all available lands would be open to livestock grazing. Grazing would be managed in accordance with Arizona Standards for Rangeland Health, reducing impacts to minor levels on all lands within the Monument. As many as six new range water developments could be built over the life of this Plan, resulting in impacts to 36 acres. Most, if not all, of the 174 existing waters in Vermilion would be inspected at least twice over the life of this Plan. As many as 30 of these waters could be repaired, rebuilt, or replaced. Impacts would be similar to those described above for wildlife water developments.

Impacts from Recreation

Impacts to vegetation resources from maintenance or restoration of natural remote settings would vary depending upon ecological zone and the method used to conduct the restoration. Impacts would be the same as those described above under Impacts from Vegetation and Fire and Fuels Management. The restriction of vegetation management treatments on vegetation resources could result in minor to moderate short and long-term impacts of risk of vegetation loss to catastrophic fire. Encroachment of undesirable species in some areas would continue unchecked.

Commercial recreation or competitive events would result in direct, minor, short-term impacts to vegetation, which include the introduction or spread of noxious weeds and trampling of individual plants. Vehicular events have the greatest potential to impact vegetation. The increase in dust associated with many of these activities could lead to a reduction in vigor or mortality of many individuals. While the No Action Alternative includes provisions to alter

recreational activities that affect sensitive areas or species, such provisions would not be enforced until after monitoring had detected the impacts.

Sightseeing and recreational driving would result in minor, short- and long-term indirect impacts to vegetation, which would include decreased plant vigor and increased mortality alongside the road, resulting from dust being deposited on individual plants. Direct, minor, short-term impacts to vegetation would result from foot traffic through sensitive areas, which could trample, injure, or kill vegetation. Camping increases the likelihood of such effects. Collection of dead and down wood for firewood would increase the extent and severity of impacts to vegetation.

Impacts from Lands and Realty

In Parashant and Vermilion, impacts to vegetation resources could result from issuance of ROWs necessary for access and/or maintenance needs to private or state inholdings, ROWs within the boundaries of existing ROWs or designated corridors, and where site-specific NEPA analysis determines that impacts to Monument objects or values would be negligible.

Impacts from issuance of ROWs would vary upon the nature and purpose of the ROWs. Impacts would be minor as any new ROW or associated actions that had more than a negligible impact on Monument objects or values would not be authorized.

In Arizona Strip FO, impacts to vegetation resources could result from disposal of property or issuance of ROWs/permits. Impacts associated with disposal of federal lands would depend upon the use of those lands by future owners. In the worst-case scenario, all vegetation would be removed from a parcel of land and the site would be paved or otherwise permanently altered so as to prevent future vegetation growth. This represents minor to moderate long-term impacts depending upon the size and location of the parcel and the occurrence of rare plant species. Parcels that include listed threatened, endangered, or proposed species would not be identified for disposal. This alternative includes more acres available for disposal than under any other alternative. Therefore, effects could occur over a larger area.

Impacts from issuance of ROWs would vary upon the nature and purpose of the ROWs. Impacts to vegetation would generally be minor to moderate and would be addressed in site-specific NEPA analysis.

Impacts from issuance of permits would vary with the nature and purpose of the permit. Impacts to vegetation would generally be negligible to minor and would be addressed in site-specific NEPA analysis.

Alternative B

Impacts from Travel Management

Impacts to vegetation resources would be the same as those described under Alternative A. However, because fewer miles of routes would be open for motorized use, impacts would occur over a smaller area than under any other alternative.

Impacts from Vegetation and Fire and Fuels Management

The types of impacts would be similar to those described under Alternative A, with the following exceptions and additions:

Using DFCs and desired plant community (DPC) objectives to make decisions would enhance protection of sensitive resources and benefit uses by emphasizing consideration of those uses in planning. Conducting restoration and vegetation treatment actions would help meet DFCs and DPC objectives. Employing seasonal restrictions on uses would also benefit vegetation resources. Identifying ecological zones with unique DFCs, DPCs, and vegetation management actions would increase management capabilities.

Collection and Use of Native Seed/Use of Non-native Plants: Impacts from the collection of native seeds in Parashant and the Arizona Strip FO would be the same as described under Alternative A. Impacts from the use non-native species in treatment efforts would be the same as those described under Alternative A.

Riparian Ecological Zone: Managing the Riparian Ecological Zone for minimum disturbance would result in moderate to major indirect, long-term impacts. The only vegetative treatment authorized would be fire use. This would promote the expansion of non-native, fire adapted plant species such as tamarisk and cheatgrass. Such impacts would include loss of diversity, increased evapotranspiration, increased ambient temperature, reduced available surface and subsurface water, increased salinity, and increased fire frequency.

Pakoon Springs Restoration: The major, indirect long-term impacts of restoring Pakoon Springs (in Parashant) without the use of vegetation treatments would be the continued proliferation of noxious weeds and exotic wildlife species. The DFCs would probably not be attainable without intervention.

Cane Springs Restoration: Removal of livestock in Cane Springs (in Parashant) would result in minor to moderate long-term indirect impacts to vegetation. As the biomass of vegetation increases, the effective ground cover would increase, erosion would decrease, and infiltration and biological productivity should increase. Species composition may not improve if desirable forage species have been locally extirpated by grazing and are not re-introduced.

In Vermilion and the Arizona Strip FO, no vegetation treatments would be planned or authorized in the Riparian Ecological Zone, except that fire use would be an option. This would promote the expansion of non-native, exotic plant species such as tamarisk. Impacts would include loss of diversity, increased evapotranspiration, increased ambient temperature, reduced available surface and subsurface water, increased salinity, and increased fire frequency.

Ponderosa Pine Ecological Zone: Under this alternative, up to 11,600 acres of ponderosa pine could be treated in Parashant. The impacts of vegetation treatments in the ponderosa pine ecological zone would be direct, moderate, and both short- and long-term. Opening the canopy would result in more sunlight reaching the forest floor, an increase in soil moisture, and would reduce the risk of catastrophic fire. Indirect impacts would be an increase vegetative vigor and understory species diversity, and the maintenance of this unique habitat. Treatments that resulted in a long-term loss of ponderosa pine and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be the loss of 2,320 acres of this habitat. Impacts would occur on fewer acres under this alternative than for any other.

Impacts from ponderosa pine restoration efforts in the Mt. Trumbull Wilderness would be similar to those described for manual treatments under Alternative A. Impacts would occur on fewer acres under this alternative compared to the other alternatives.

In the Arizona Strip FO, no vegetation treatments would be planned in this ecological zone under this alternative. Therefore, impacts would include an increased risk of catastrophic or stand-replacement fire.

Great Basin Ecological Zone: Impacts from treatment of sagebrush communities in this ecological zone would be similar to those described under Alternative A. Under this alternative, up to 5,000 acres of Great Basin sagebrush could be treated in Parashant and up to 20,000 acres in the Arizona Strip FO. In Vermilion, no vegetation treatments would be planned or authorized in sagebrush communities. Treatments that resulted in a long-term loss of sagebrush and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 1,000 acres of this habitat in Parashant and up to 4,000 acres in the Arizona Strip FO. Impacts would occur on fewer acres under this alternative compared to the alternatives.

Impacts from treatment of pinyon-juniper communities in this ecological zone would be similar to those described for vegetation treatments and prescribed fire, fire use, and management under Alternative A. Under this alternative, up to 10,100 acres of Great Basin pinyon-juniper could be treated in Parashant and up to 10,000 acres each in Vermilion and the Arizona Strip FO. Treatments that resulted in a long-term loss of pinyon-juniper and conversion to a stable non-target community would be considered a failure. A worst case estimate would be loss of 2,020 acres of this habitat in Parashant and up to 2,000 acres each in Vermilion and the Arizona Strip FO. Impacts would occur on fewer acres under this alternative compared to the other alternatives.

Mojave Desert Ecological Zone: No vegetation treatments would be planned in this ecological zone. Impacts to vegetation would be the continued expansion of cheatgrass and other impacts similar to those described for fire suppression, use, and management under Alternative A.

Mojave-Great Basin Transition Ecological Zone: No vegetation treatments would be planned in this ecological zone, though fire use could still be authorized. Impacts to vegetation would be the continued expansion of cheatgrass, and other impacts similar to those described in the Fire Suppression under Alternative A.

Colorado Plateau Transition Ecological Zone: In Vermilion, no vegetation treatments would be planned in this ecological zone, though fire use could still be authorized. Impacts to vegetation would be would be similar to those described under Alternative A.

Interior Chaparral Ecological Zone: No vegetation treatments would be conducted. The continued maturation of interior chaparral sites would lead to a reduction in bare ground space, reduction in diversity, and increased risk of high intensity fire.

Plains - Grassland Ecological Zone: No vegetation treatments would be conducted, except that fire use could be considered. Impacts to vegetation would be the continued expansion of cheatgrass and impacts similar to those described in the Fire Suppression, Use, and Management section under Alternative A.

Impacts from Air, Water, and Soil Resources

Impacts would be similar to those described under Alternative A. However, in Parashant, salvage and replanting to mitigate impacts of authorized uses would have minor direct short and long-term impacts on vegetation by improving effective ground cover and vegetative structure, and minor indirect long-term impacts by increasing infiltration, improving biomass productivity, and providing wildlife habitat attributes.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative A.

Impacts from Special Status Species

Impacts to vegetation resources would be similar to those described under Alternative A, with the following exceptions:

In Parashant, not authorizing mechanical treatments in special status species habitats would reduce or eliminate potential impacts such as trampling, loss of individuals, reduction in vigor, increased risk of invasion of noxious weeds, alteration of local micro-climate conditions that could affect species composition and distribution, increased soil movement, and susceptibility to erosion.

Introducing special status aquatic species at Pakoon Springs or other locations within Parashant could have moderate, long-term direct and indirect impacts on vegetation if the presence of the transplanted species would restrict treatments to improve or maintain species composition and/or control noxious weeds.

In the Arizona Strip FO, mechanical treatments would not be authorized in special status species habitats. This would reduce or eliminate potential adverse effects such as trampling, loss of individuals, reduction in vigor, increased risk of invasion of noxious weeds, alteration of local micro-climate conditions that could affect species composition and distribution, increased soil movement, and susceptibility to erosion.

Impacts from Visual Resources

The types of impacts to vegetation resources would be the same as those described under Alternative A. In both Monuments, since no areas would be designated as VRM Class III and only 24 acres as Class IV, there would be no locations where proposed projects could be relocated. Fewer projects would thus be authorized. This could slow or preclude achievement of DFCs. In the Arizona Strip FO, since 1,379,468 acres would be designated as VRM Class III and 72,803 acres as Class IV, there would be various locations where proposed projects could be relocated. These projects could assist in achieving DFCs.

Impacts from Minerals (Arizona Strip FO only)

In the Arizona Strip FO, impacts to vegetation resources would be the same as described under Alternative A, except that additional measures would be implemented to protect vegetation in sensitive areas.

Impacts from Livestock Grazing

The types of impacts would be similar to those described under Alternative A, although impacts would occur over a smaller area due to fewer acres being made available to livestock grazing. In Parashant, 149,338 fewer acres would be available for grazing due to the closing of two additional allotments when compared to Alternative A. Impacts from elimination of grazing on these allotments would be the same as described under Alternative A. Seasonal restrictions would also reduce impacts compared to Alternative A. In Vermilion, 18,176 acres would not be available for livestock grazing, and impacts would not occur on these lands. In the Arizona Strip FO, up to 127,267 acres would be unavailable to livestock grazing, reducing the number acres where impacts would occur.

Impacts from Recreation

Impacts to vegetation resources would be similar to those described under Alternative A. Additional impacts would occur in Parashant due to the construction of recreation infrastructure, such as visitor kiosks and interpretive signs, which would result in direct, minor, long-term impacts by permanently removing vegetation within the footprint of the structures and injuring surrounding vegetation. Indirect, minor, long-term impacts would result from compaction caused by visitor use, reduced infiltration, increased erosion, increased likelihood of fire, and reduction in biological productivity.

Impacts from Lands and Realty

Impacts would be the same as those described Alternative A, with the exception that fewer acres would be identified for disposal in the Arizona Strip FO, thus reducing the total area of impact.

Alternative C

Impacts from Travel Management

The types of impacts would be similar to those described under Alternative A, although the magnitude of impacts would be less under Alternative C due to the reduced number of roads open for public use, but greater when compared to Alternative B.

Impacts from Vegetation and Fire and Fuels Management

Impacts to vegetation resources would be similar to those described under Alternative B, with the following exceptions:

Riparian Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described for chemical treatments and prescribed fire, fire use, and management under Alternative A. This alternative allows for treatment of invasive species such as tamarisk and Russian olive. Impacts could occur on up to 110 acres in Parashant, 500 acres in Vermilion, and 1,000 acres in the Arizona Strip FO, fewer than under any other alternative except B. Since treatments would target invasive exotics, a failed treatment would include complete removal of these species without successfully re-establishing native willow or cottonwoods. The invasive species would likely become re-established within a few years. As a result, even in a worst-case scenario, no treatments are anticipated to result in permanent loss or conversion of riparian habitat.

Pakoon Springs Restoration: Restoration of processes and function at Pakoon Springs would result in minor, short-term direct impacts including injury, mortality, or removal of individual plants or species. Major, long-term indirect impacts could include increased biomass productivity and improvement of wildlife habitat for target species. Restoration treatments could

result in loss of some of the existing man-made ponds at the site. However, since the water that supplies these ponds comes from natural, on-site sources, new riparian areas would likely result in areas where the water is diverted. If the water is allowed to flow into the existing dry wash, new riparian areas could potentially exceed the existing areas in size and extent.

Tassi Ranch and Springs Restoration: Restoration actions at Tassi Springs would result in minor, short-term direct impacts including injury, mortality, or removal of individual plants or species. Major, long-term indirect impacts could include increased biomass productivity and improvement of wildlife habitat for target species. Introduction of relict leopard frogs or other special status species could delay restoration by limiting the use of restoration tools that would adversely affect the species.

Cane Springs Restoration: Vegetation resources would benefit from closing Cane Springs to grazing by mitigating or eliminating past impacts. Developing an interpretive site could result in minor, short- and long-term impacts to vegetation by increasing visitation to the site, which would result in increased disturbance and trampling, compaction and minor erosion of pathways and trails, and increased likelihood of fire.

Paria River Invasive Plant Species Removal: Impacts from Paria River invasive plat species removal in Vermilion would be the same as those described for prescribed fire, fire use, and management and for chemical treatments under Alternative A. Impacts could occur over a larger area under this alternative than under Alternative B, but less than all other alternatives.

Ponderosa Pine Ecological Zone: In Parashant and the Arizona Strip FO, impacts would be the same as those described for each of the various treatment methods under Alternative A. Impacts could occur on up to 16,200 acres in Parashant and up to 1,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of ponderosa pine and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be the loss of 3,240 acres of this habitat in Parashant and up to 200 acres in the Arizona Strip FO. Impacts could occur over a larger area under this alternative than under Alternative B, but less than under Alternative D.

Mt. Trumbull Wilderness: Impacts would be the same as those described for prescribed fire, fire use, and management and manual vegetation treatments under Alternative A. Impacts could occur over a larger area under this alternative than under Alternative B, but less than under Alternative D.

In the Arizona Strip FO, impacts from vegetation treatments in this ecological zone would be similar to those described for each of the various treatment methods under Alternative A. Impacts would occur on fewer acres than all other alternatives with the exception of Alternative B.

Great Basin Ecological Zone: Impacts from vegetation treatments in sagebrush communities would be the same as those described for chemical treatments and prescribed fire, fire use, and management under Alternative A. Impacts could occur on up to 25,000 acres in Parashant, up to 50,000 acres in Vermilion, and up to 100,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of sagebrush and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be the loss of 5,000 acres of this habitat in Parashant, up to 10,000 acres in Vermilion, and up to 20,000 acres in the Arizona Strip FO. Impacts could occur on fewer acres under this alternative than any other, with the exception of Alternative B.

Impacts from vegetation treatments in pinyon-juniper communities would be the same as those described for chemical and mechanical treatments and prescribed fire, fire use, and management under Alternative A. Impacts to pinyon-juniper communities could occur on up to 41,000 acres in Parashant and up to 30,000 acres each in Vermilion and the Arizona Strip FO. Treatments that resulted in a long-term loss of pinyon-juniper and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 8,200 acres of this habitat in Parashant and up to 6,000 acres each in Vermilion and the Arizona Strip FO. Impacts could occur on fewer acres under this alternative than any other, with the exception of Alternative B.

Mojave Desert Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described for chemical treatments under Alternative A. Impacts could occur on up to 70,000 acres in Parashant and up to 5,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of Mojave Desert communities and conversion to a stable, non-target community, such as cheatgrass, would be considered a failure. A worst-case estimate would be loss of 14,000 acres of this habitat in Parashant and up to 1,000 acres in the Arizona Strip FO. Failed treatments of this magnitude are unlikely since treatments in this ecological zone are typically limited in scope or extent due to the sensitivity of desert tortoise habitats. Impacts could occur on fewer acres under this alternative than any other, with the exception of Alternative B.

Mojave-Great Basin Transition Ecological Zone: In Parashant, impacts from vegetation treatments in this ecological zone would be the same as those described for chemical treatments under Alternative A. Impacts could occur on up to 150,000 acres in Parashant and up to 5,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of Mojave Desert communities and conversion to a stable, non-target community, such as cheatgrass, would be considered a failure. A worst-case estimate would be loss of 30,000 acres of this habitat in Parashant and up to 1,000 acres in the Arizona Strip FO. Failed treatments of this magnitude are unlikely since treatments in this ecological zone are typically limited in scope or extent due to the sensitivity of desert tortoise habitats. Impacts could occur on fewer acres under this alternative than any other, with the exception of Alternative B.

Colorado Plateau Transition Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described for the various treatment methods under

Alternative A. Impacts could occur on up to 5,000 acres in Vermilion and up to 5,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of vegetative communities and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 1,000 acres of this habitat each in Vermilion and the Arizona Strip FO. Impacts would occur on fewer acres compared to the other alternatives, with the exception of Alternative B.

Interior Chaparral Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described for mechanical and chemical treatments under Alternative A. Impacts could occur on up to 1,500 acres in Parashant and up to 1,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of interior chaparral habitat and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 300 acres of this habitat in Parashant and up to 200 acres in the Arizona Strip FO. Impacts could occur on fewer acres under this alternative than any other, with the exception of Alternative B.

Plains-Grassland Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described for prescribed fire, fire use, and management and for mechanical and chemical treatments under Alternative A. Impacts could occur on up to 50 acres in Parashant, up to 5,000 acres in Vermilion, and up to 50,000 acres in Arizona Strip FO. Treatments that resulted in a long-term loss of grassland habitat and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 10 acres of this habitat in Parashant, up to 1,000 acres in Vermilion, and up to 10,000 acres in the Arizona Strip FO. The impacts could occur on fewer acres under this alternative than any other, with the exception of Alternative B.

Impacts from Soil, Water and Air Resources

Impacts would be similar to those described under Alternative B.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative A, with the exception that the extent of the impacts from Watchable Wildlife areas would be more widespread in Parashant due to four additional areas, and more widespread in the Arizona Strip FO due to five additional areas. Impacts from Watchable Wildlife areas would also be experienced in Vermilion as one such area would be identified under Alternative C.

Impacts from Special Status Species

Impacts would be similar in nature and scope to those described under Alternative B, with the following exceptions:

In Parashant, introduction of relict leopard frogs or other special status species at Pakoon Springs and/or Tassi Springs and Ranch could limit use of restoration tools that would result in adverse effects to the species and could delay restoration.

Burrowing Owl: In Parashant, augmenting existing Burrowing Owl populations and installing artificial nest burrows in the Pakoon Basin would have minor, short-term direct impacts to local vegetation, including removal or trampling of individual plants. These impacts would not likely exceed 2 acres for each group of 16 Burrowing Owls released, or less than 10 acres over the life of the Plan.

In the Arizona Strip FO, augmenting existing Burrowing Owl populations and installing artificial nest burrows would have minor, short-term direct impacts to local vegetation, including removal or trampling of individual plants. These impacts would not likely exceed 2 acres for each group of 16 Burrowing Owls released, or less than 20 acres over the life of the Plan.

Impacts from Visual Resources

Impacts would be similar in nature and scope to those described under Alternative A, with the exceptions that more acres would be managed under VRM Class III in all three planning areas, and more acres would be managed under both VRM Classes III and IV in Vermilion. As a result, impacts to vegetation resources would occur over a larger area where vegetation treatment, restoration, and weed treatment projects could be authorized with fewer restrictions.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

Impacts would be similar in nature and scope to those described under Alternative A. However, in Parashant, impacts would occur over a larger area and over a longer period than under Alternative B due to an increase in the size and/or season of use of areas available for livestock grazing, although this would be less than under Alternative A. In Vermilion, some 15,610 acres would be available for seasonal livestock grazing only. The duration of impacts in these areas would be shorter. In the Arizona Strip FO, the inclusion of additional acreage with seasonal grazing restrictions would result in impacts of shorter duration over that portion of the range.

Impacts from Recreation

Impacts would be similar in nature and scope to those described under Alternative A. In addition, developing interpretive sites in Parashant could result in minor, short- and long-term impacts to vegetation by increasing visitation to the site, which would result in increased

disturbance and trampling, compaction and minor erosion of pathways and trails, and the likelihood of fire.

Impacts from Lands and Realty

Impacts would be similar in nature and scope to those described under Alternative B, with the exception that slightly more acres would be identified for disposal in the Arizona Strip FO, resulting in impacts that are more widespread.

Alternative D

Impacts from Travel Management

The types of impacts would be similar to those described under Alternative A. However, impacts would occur over a larger area than under the other alternatives except Alternative A as Alternative D proposes fewer miles of roads closed and more miles open than any other alternative except A.

Impacts from Vegetation and Fire and Fuels Management

Impacts would similar to those described under Alternatives B, with the following exceptions:

Riparian Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A under each of the various treatment methods. Impacts could occur on up to 220 acres in Parashant, up to 1,560 acres in Vermilion, and up to 5,000 acres in Arizona Strip FO. Since treatments would target invasive exotics, a failed treatment would include complete removal of these species without successfully re-establishing native willow or cottonwoods. Invasive species would likely become re-established within a few years. As a result, even in a worst-case scenario, no treatments are anticipated to result in permanent loss or conversion of riparian habitat. Due to these acreages proposed for treatment, the impacts could occur over a larger area under this alternative than under any other alternative, with the exception of Alternative A.

Pakoon Springs Restoration: Impacts from restoration treatments would be similar to those described under Alternative C. Developing an interpretive site could resulting minor, short- and long-term impacts to vegetation by increasing visitation to the site, which would result in increased disturbance and trampling, compaction and minor erosion of pathways and trails, and increased likelihood of fire.

Tassi Springs and Ranch Restoration: Impacts would be similar to those described under Alternative C.

Cane Springs Restoration: Impacts would be similar to those described under Alternative C.

Paria River Invasive Plant Species Removal: Impacts would be the same as those described under Alternative A for each treatment method. Impacts could occur over a larger area than Alternatives B and C, but the same as Alternative E.

In the Arizona Strip FO, impacts would be similar to those described under Alternative A for the various treatment methods. Impacts would occur on more acres under this alternative than under any other alternative.

Ponderosa Pine Ecological Zone: In Parashant, impacts would be the same as those described under Alternative A for each of the various treatment methods. Impacts could occur on up to 20,800 acres in Parashant and up to 3,800 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of ponderosa pine and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 4,160 acres of this habitat in Parashant and up to 760 acres in the Arizona Strip FO. Impacts could occur over a larger area under this alternative than under any other alternative with the exception of Alternative A.

Mt. Trumbull Wilderness: Impacts would be the same as those described under Alternative A for prescribed fire, fire Use, and management and manual treatments. Impacts could occur over a larger area under this alternative than under any other alternative with the exception of Alternative A.

In Arizona Strip FO, impacts from vegetation treatments would be similar to those described under Alternative A for each of the various treatment methods. Impacts would occur on more acres under this alternative than for any other

Great Basin Ecological Zone: Impacts from vegetation treatments in sagebrush communities would be the same as those described for chemical treatments and prescribed fire, fire use, and management under Alternative A. Impacts could occur on up to 50,000 acres in Parashant, up to 100,000 acres in Vermilion, and up to 200,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of sagebrush and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 10,000 acres of this habitat in Parashant, up to 20,000 acres in Vermilion, and up to 40,000 acres in the Arizona Strip FO. Impacts could occur over a larger area under this alternative than under any other alternative with the exception of Alternative A.

Impacts from vegetation treatments in pinyon-juniper communities would be the same as described under Alternative A for chemical treatments, mechanical treatments, and prescribed fire, fire use and management. Impacts could occur on up to 136,000 acres in Parashant, up to 50,000 acres in Vermilion, and up to 100,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of pinyon-juniper and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 27,200 acres of this habitat in Parashant, up to 10,000 acres in Vermilion, and up to 20,000 acres in the Arizona Strip

FO. Impacts could occur over a larger area under this alternative than under any other alternative with the exception of Alternative A.

Mojave Desert Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for chemical and biological treatments. Impacts could occur on up to 80,000 acres in Parashant and up to 10,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of Mojave Desert communities and conversion to a stable non-target community, such as cheatgrass, would be considered a failure. A worst-case estimate would be loss of 16,000 acres of this habitat in Parashant and up to 2,000 acres in the Arizona Strip FO. Failed treatments of this magnitude are unlikely since treatments in this ecological zone are typically limited in scope or extent due to the sensitivity of desert tortoise habitats. Impacts could occur over a larger area under this alternative than under any other alternative with the exception of Alternative A.

Mojave-Great Basin Transition Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for chemical and biological treatments. Impacts could occur on up to 180,000 acres in Parashant and up to 30,000 acres in the Arizona Strip FO. Desert communities and conversion to a stable, non-target community, such as cheatgrass, would be considered a failure. A worst-case estimate would be loss of 36,000 acres of this habitat in Parashant and up to 6,000 acres in the Arizona Strip FO. Failed treatments of this magnitude are unlikely since treatments in this ecological zone are typically limited in scope or extent due to the sensitivity of desert tortoise habitats. Impacts could occur over a larger area under this alternative than under any other alternative with the exception of Alternative A.

Colorado Plateau Transition Ecological Zone: In Vermilion and Arizona Strip FO, impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the each of the various treatment methods. Impacts could occur on up to 30,000 acres in Vermilion and up to 30,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of vegetative communities and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 6,000 acres of this habitat each in Vermilion and the Arizona Strip FO. Impacts could occur over a larger area than for any other alternative.

Interior Chaparral Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described for mechanical, chemical, and biological treatments under Alternative A. Impacts could occur on up to 2,500 acres in Parashant and up to 5,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of interior chaparral habitat and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 500 acres of this habitat in Parashant and up to 1,000 acres in the Arizona Strip FO. Impacts could occur over a larger area under this alternative than under any other with the exception of Alternative A.

Plains-Grassland Ecological Zone: Impacts from vegetation treatments in this ecological zone would be the same as those described under A for mechanical, chemical, and biological treatments. Impacts could occur on up to 110 acres in Parashant, up to 10,000 acres in Vermilion, and up to 100,000 acres in the Arizona Strip FO. Treatments that resulted in a long-term loss of grassland habitat and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 22 acres of this habitat in Parashant, up to 2,000 acres in Vermilion, and up to 20,000 acres in the Arizona Strip FO. Impacts could occur over a larger area under this alternative than under any other alternative with the exception of Alternative A.

Impacts from Soil, Water and Air Resources

Impacts would be similar to those described under Alternative A.

Impacts from Fish and Wildlife

Impacts to would be the same as described under Alternative C.

Impacts from Special Status Species

Impacts to vegetation resources would be the same as those described under Alternatives A, with exception that augmenting existing Burrowing Owl populations and installing artificial nest burrows in the Arizona Strip FO would have the same effects as those described under Alternative C.

Impacts from Visual Resources

The types of impacts would be similar to those described under Alternatives A. However, in both Parashant and the Arizona Strip FO, the number of acres managed as VRM Class III would be the larger than under any other alternative, allowing more acres that could be restored or treated. Therefore, impacts to vegetation resources would be greater than under the other alternatives. In Vermilion, no acres would be managed VRM Class III and only 12 acres would be managed as VRM Class IV, limiting the number of acres that could be restored or treated.

Impacts from Minerals (Arizona Strip FO only)

Impacts to vegetation resources would be the same as described under Alternatives A.

Impacts from Livestock Grazing

Impacts would be similar in nature and scope to those described under Alternative A and would occur over a larger area and longer period than for under any other alternatives except Alternative A. In Parashant, impacts would occur over a larger area and over a longer period than under Alternatives B and C due to the size and/or season of use of areas open to livestock

grazing. In Vermilion, some 15,610 acres would be available for seasonal livestock grazing only, which would shorten the duration of impacts in these areas. In the Arizona Strip FO, the inclusion of additional acreage with seasonal grazing restrictions would result in impacts of shorter duration over that portion of the range.

Impacts from Recreation

Impacts would be similar in nature and scope to those described under Alternative A.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative C.

Alternative E: Proposed Plan

Impacts from Travel Management

Impacts would be similar to those described under Alternative A, although less widespread in the Monuments due to a 18 percent decrease in roads remaining open in Parashant and a 15 percent decrease in Vermilion. In the Arizona Strip FO, the initial magnitude of the impact would be similar to Alternative A, although future route designation decisions would be made that would potentially close some roads, thus reducing the total area of impacts.

Impacts from Vegetation and Fire and Fuels Management

Impacts would similar to those described under Alternative B, with the following exceptions:

Riparian Ecological Zone: Impacts would be the same as those described for each treatment method under Alternative A. Impacts could occur on up to 110 acres in Parashant, similar to Alternative C. Impacts could occur on up to 1,560 acres in Vermilion and up to 5,000 acres in the Arizona Strip FO, similar to Alternative D. Since treatments would target invasive exotics, a failed treatment would include complete removal of these species without successfully re-establishing native willow or cottonwoods. The invasive species would likely become re-established within a few years. As a result, even in a worst-case scenario, no treatments are anticipated to result in permanent loss or conversion of riparian habitat.

Pakoon Springs Restoration: Impacts would be similar to those described under Alternative D.

Tassi Springs and Ranch Restoration: Impacts would be similar to those described under Alternative C.

Paria River Invasive Plant Species Removal Impacts would be the same as those described under Alternative A for each treatment method. Impacts could occur over a larger area than Alternatives B and C, but the same as Alternative D.

Ponderosa Pine Ecological Zone: In Parashant, impacts would be the same as those described under Alternative A for each of the various treatment methods. Impacts could occur on up to 20,800 acres in Parashant and up to 3,800 acres in the Arizona Strip FO, similar to Alternative D. Treatments that resulted in a long-term loss of ponderosa pine and conversion to a stable non-target community would be considered a failure. A worst-case estimate would be loss of 4,160 acres of this habitat in Parashant and up to 760 acres in the Arizona Strip FO. Impacts could occur over a larger area under this alternative than under any other except Alternative D.

Mt. Trumbull Wilderness: Impacts would be the same as those described under Alternative A for manual treatments and prescribed fire, fire use, and management,. Impacts could occur over a larger area under this alternative than under Alternative B, but less than under Alternative D.

Great Basin Ecological Zone: Impacts from vegetation treatments in sagebrush communities would be the same as those described under Alternative A for chemical treatments and prescribed fire, fire use, and management. Impacts could occur on up to 25,000 acres in Parashant, similar to Alternative C. Impacts could occur on up to 100,000 acres in Vermilion and up to 200,000 acres in the Arizona Strip FO, similar to Alternative D. Treatments that resulted in a long-term loss of sagebrush and conversion to a stable non-target community would be considered a failure. A worst-case estimate would be loss of 5,000 acres of this habitat in Parashant, up to 20,000 acres in Vermilion, and up to 40,000 acres in the Arizona Strip FO. Impacts could occur over a larger area under this alternative than under any other with the exception of Alternative A.

Impacts to pinyon-juniper communities would be the same as those described under Alternative A for chemical and mechanical treatments and prescribed fire, fire use, and management. Impacts could occur on up to 136,000 acres in Parashant, up to 50,000 acres in Vermilion, and up to 100,000 acres in the Arizona Strip FO, similar to Alternative D. Treatments that resulted in a long-term loss of pinyon-juniper and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 27,200 acres of this habitat in Parashant, up to 10,000 acres in Vermilion, and up to 20,000 acres in the Arizona Strip FO.

Mojave Desert Ecological Zone: Impacts would be the same as those described under Alternative A for chemical treatments. Impacts could occur on up to 70,000 acres in Parashant, as in Alternative C. Impacts could occur on up to 10,000 acres in the Arizona Strip FO, similar to Alternative D. Treatments that resulted in a long-term loss of Mojave Desert communities and conversion to a stable, non-target community, such as cheatgrass, would be considered a failure. A worst-case estimate would be loss of 14,000 acres of this habitat in Parashant and up to 2,000 acres in the Arizona Strip FO. Failed treatments of this magnitude are unlikely since treatments

in this ecological zone are typically limited in scope or extent due to the sensitivity of desert tortoise habitats.

Mojave-Great Basin Transition Ecological Zone: Impacts would be the same as those described under Alternative A for chemical treatments. Impacts could occur on up to 150,000 acres in Parashant, similar to Alternative C. Impacts could occur on up to 30,000 acres in the Arizona Strip FO, similar to Alternative D. Treatments that resulted in a long-term loss of Mojave Desert communities and conversion to a stable non-target community, such as cheatgrass, would be considered a failure. A worst-case estimate would be loss of 30,000 acres of this habitat in Parashant and up to 6,000 acres in the Arizona Strip FO. Failed treatments of this magnitude are unlikely since treatments in this ecological zone are typically limited in scope or extent due to the sensitivity of desert tortoise habitats.

Colorado Plateau Transition Ecological Zone: Impacts would be similar to those described under Alternative A for the various treatment methods used. Impacts could occur on up to 30,000 acres each in Vermilion and Arizona Strip FO, similar to Alternative D. Treatments that resulted in a long-term loss of vegetative communities and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 6,000 acres of this habitat each in Vermilion and the Arizona Strip FO. Impacts could occur over a larger area than for any other alternative.

Interior Chaparral Ecological Zone: Impacts would be the same as those described under Alternative A for mechanical and chemical treatments. Impacts could occur on up to 1,500 acres in Parashant, similar to Alternative C. Impacts could occur on up to 5,000 acres in the Arizona Strip FO, similar to Alternative D. Treatments that resulted in a long-term loss of interior chaparral habitat and conversion to a stable, non-target community would be considered a failure. A worst-case estimate would be loss of 300 acres of this habitat in Parashant and up to 1,000 acres in the Arizona Strip FO.

Plains-Grassland Ecological Zone: Impacts would be the same as those described under Alternative A for mechanical and chemical treatments. Total area covered by potential impacts to this ecological zone would be the same area as discussed under Alternative D.

Impacts from Soil, Water and Air Resources

Impacts would be the same as described under Alternative A.

Impacts from Fish and Wildlife

Impacts would be the same as described under Alternative C.

Impacts from Special Status Species

Impacts would be the same as those described under Alternative A, with exception that augmenting existing Burrowing Owl populations and installing artificial nest burrows in the Arizona Strip FO would have the same effects as those described under Alternative C.

Impacts from Visual Resources

For Parashant, impacts would be the same as those described under Alternative C. For Vermilion, impacts would be the same as described under Alternative A, although with more areas designated VRM Class IV, vegetation treatment, restoration, and weed treatment projects could be authorized with fewer restrictions. For the Arizona Strip FO, impacts would be similar to those described under Alternative D. For all three planning areas under this alternative, VRM Class I would be restricted to designated and proposed wilderness areas only.

Impacts from Minerals (Arizona Strip FO only)

Impacts to vegetation resources would be the same as described under Alternatives A.

Impacts from Livestock Grazing

The types of impacts to vegetation resources would be the same as those described under Alternative A. The location and duration of impacts would be similar to Alternative B for Vermilion and Alternative D for the Arizona Strip FO. In Parashant, impacts would occur over a larger area and over a longer period than Alternatives B and C due to the size and/or season of use of areas open to livestock grazing. For the entire planning area, more acres would be under seasonal use restrictions than under any other alternative with the exception of Alternative C.

Impacts from Recreation

Impacts would be similar to those described under Alternative A.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative C.

Cumulative Impacts

The geographic area of the cumulative impacts analysis for vegetation is the Planning Area. Vegetation in the Arizona Strip has gone through significant changes since the 1870s due to historic land use practices and the introduction of non-native species. This analysis will only address the changes brought about by the plan decisions, which are described from the present situation.

Prescribed fire, restoration land treatments, control of exotic species and noxious weeds, and route restrictions and closures would impact vegetation by improving plant vigor, plant diversity, and native species, consequently improving the ecosystem health of the vegetation on the Strip.

In the Mojave Desert, the loss of natural vegetation is occurring due to wild fires and the subsequent spread of cheatgrass. Cheatgrass makes the area more susceptible to fire and, therefore, increases the frequency and size of wildfire. If the trend continues, there will be little native Mohave vegetation in the future. Various treatments would be proposed in the future to change this tide; however the likelihood of success is low due to the climatic conditions and the perpetual nature of cheatgrass and wildfire in the Mohave Desert. Currently, the area is functioning outside the range of natural variability and is in a state of declining health and biodiversity. Fire is not part of the evolutionary processes that have developed the ecosystem.

The restoration land treatment proposed in the ponderosa pine, pinyon- juniper, and sagebrush ecosystems would improve ecological processes and functions. An increase in plant diversity and increased soil stability would be expected. In areas of designated wilderness, proposed wilderness, wilderness characteristics, and VRM Class I and II areas, restoration of ecological health would take more time due the restriction of the tools available for restoration work.

Livestock grazing would continue over most of the Arizona Strip. The Standards and Guides analysis and permit renewal process would help ensure grazing practices are conducted in a manner to maintain or improve the ecological health of the area. Rangeland management practices would act to prevent and control the spread of invasive plant species, maintain diverse and natural plant communities, improve wildlife habitat, reduce erosion, and improve water quality. The objectives developed to manage for healthy rangelands have a goal of keeping the entire ecosystem healthy and productive in order to ensure that it yields both usable products and intrinsic values.

FIRE AND FUELS MANAGEMENT

This section describes potential impacts of the alternatives on fire and fuels management. The alternatives can affect hazardous fuel loads and the BLM's ability to manage them; tools for implementing fuels treatments; the potential for human-caused ignitions; fire suppression activities; fire use; threats to people, property, and sensitive resources from wildland fire; Fire Regime/Condition Class (FRCC); and the risk of undesirable wildland fire.

Methods and Assumptions

The analysis of potential impacts to fire and fuels management is based on the expertise of BLM resource specialists at the Arizona Strip FO and the NPS staff at Parashant and Lake Mead NRA, information in the Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management (2004), and scientific literature.

Effects are quantified where possible. Best professional judgment was used when quantifiable data were unavailable. The intensities of impacts are also described, where possible, using the following guidance:

Negligible — The impact would not be detectable. Threats to people, property or sensitive resources from wildland fire would not change. Ability to implement appropriate management response and hazardous fuels treatments would not be affected. Changes to fuel loads, FRCC, and risk of undesirable wildland fire would affect minimal acres.

Minor — The impact would be detectable. Threats to people, property or sensitive resources from wildland fire would be minor. Minor changes in ability to implement appropriate management response and hazardous fuels treatments would occur. Changes to fuel loads, FRCC, and risk of undesirable wildland fire would be measurable or perceptible, but localized in relatively small areas.

Moderate — The impact would be readily apparent. Threats to people, property, or sensitive resources from wildland fire would be moderate. Moderate changes in ability to implement appropriate management response and hazardous fuels treatments would occur. Changes to fuel loads, FRCC, and risk of undesirable wildland fire would be measurable or perceptible over a moderately sized area.

Major — The impact would be severe. Threats to people, property, or sensitive resources from wildland fire would be greatly affected. The ability to implement appropriate management response and hazardous fuels treatments would be greatly changed. Changes to fuel loads, FRCC, and risk of undesirable wildland fire would be measurable or perceptible over a large area.

The following assumptions regarding fire and fuels management are made:

- All fire and fuels management policies, guidelines, and procedures would be followed.
- Fire and fuels would be managed to meet the objectives described in the Fire Management Plan.
- All Conservation Measures pertaining to fire suppression operations would be followed unless firefighter or public safety, or the protection of property, improvements, or natural resources renders them infeasible during a particular operation. All conservation measures pertaining to fuels treatments would be followed when implementing wildland fire use, prescribed fires, and other vegetation treatments.

Impacts to Fire and Fuels Management

Impacts to vegetation resources would result from actions proposed under the following resource management programs:

- Travel Management
- Wilderness Characteristics
- Vegetation and Fire and Fuels Management
- Fish and Wildlife
- Special Status Species
- Visual
- Cultural Resources
- Livestock Grazing
- Recreation

Alternative A: No Action

Impacts from Travel Management

Historically, most wildland fires in the Planning Area have been ignited by lightening. However, the potential for human-ignited wildland fires would increase with rising human use of the Planning Area. Areas accessible by motorized vehicles would likely be the most susceptible to human-ignited wildland fires, but it is impossible to quantify increases in ignitions and acres burned. Cross-country access for wildland fire suppression would be authorized under all alternatives. Maintaining or upgrading designated routes could make these areas more accessible to fire suppression vehicles and improve the effectiveness of fire suppression actions, but also lead to increased public use. Impacts could be negligible to moderate.

Impacts from Wilderness Characteristics

No areas would be identified for maintaining wilderness characteristics under Alternative A.

Impacts from Vegetation and Fire and Fuels Management

Fuels and vegetation treatments would continue to be implemented with no maximum acreage limits, treatment priority criteria, or treatment preferences for ecological zones. Prescribed fire, fire use, and manual treatments following minimum tool requirements would not be authorized for all wilderness areas. Treatments would directly affect fuel loads and could indirectly affect fire suppression, as treated areas may burn less intensely than untreated areas in wildland fires. Fire use could increase the size of fires that would have otherwise been suppressed. Impacts would be moderate. The duration of impacts would vary by vegetation type depending on the rate of regeneration after treatments.

Impacts from Fish and Wildlife

Building new artificial water sources would provide water for fire suppression activities. Effects would be localized and depend on whether wildland fires occur in the vicinity of the new water developments. Impacts could range from negligible to minor. Pronghorn passable fences would reduce fuel loads by minimizing tumbleweeds piled along fences. Impacts would be negligible to minor because this has not been a significant problem in the past. Restricting activities during desert bighorn sheep lambing (December 1-May 31) could impact the timing of fuels treatment projects or fire use. Impacts would be negligible because treatments could be rescheduled, and restrictions would occur outside of the peak wildland fire season.

Impacts from Special Status Species

Measures to mitigate fire management actions in special status species habitats could increase suppression costs, limit suppression equipment choices and tactics, require additional effort from firefighters, and limit options for treating hazardous fuels in some areas. Reintroductions of special status species could increase the areas where these measures would be required. Impacts of the measures and reintroductions could range from negligible to minor, depending on the area and frequency and intensity of wildland fires. Implementing Peregrine Falcon restrictions from March – July could impact fire suppression activities and the implementation of fuels treatments. Impacts would be negligible because the decision would affect a small area. Limiting available tools could reduce the effectiveness and efficiency of fuels treatments, potentially resulting in impacts that are negligible to moderate depending on the type of fuels being treated, size of fuels treatment, and threat of wildland fire.

Impacts from Visual Resources

Because fuels treatments would need to be compatible with VRM classes, the types and scope of fuels treatments would be limited in VRM Classes I and II. See Impacts from Visual Resources in the Impacts to Vegetation section. In Parashant, the least number of acres would be designated as VRM classes I and II under Alternative A. Impacts would be negligible to minor because fuels treatments could be implemented in VRM classes III and IV. In the Arizona Strip FO, Alternative A proposes the most acres of VRM classes I and II (when combined) but the smallest acreage for VRM classes III and IV (when combined) compared to the other alternatives. Impacts would be moderate. Fuels treatments are a low priority in Vermilion, so impacts would be negligible under all alternatives.

Impacts from Cultural Resources

Required compliance with NEPA and the National Historic Preservation Act (NHPA) and proactive cultural resource inventory and other work could limit fire and fuels management actions and increase costs for compliance and mitigation. Impacts could be minor to moderate, depending on ability to fund compliance and mitigation for fuels treatments.

Impacts from Livestock Grazing

Livestock grazing could reduce fine fuel loads and the size and intensity of wildland fires in some areas during high grass production years. See description of livestock grazing impacts under the Impacts to Vegetation section for additional effects to vegetation and fuels and impacts of managing areas as forage reserves. Activities associated with livestock grazing could increase wildland fire ignitions. Under Alternative A, seasons of use for some allotments would be greater than under other alternatives, and portions of some allotments would be unavailable to livestock grazing. Impacts could be negligible to moderate, depending on the recovery of these areas, rainfall, and other factors affecting fuel loads, and may vary from year to year. Impacts from the construction and maintenance of water developments would be similar to those from wildlife water developments.

Impacts from Recreation

Increased participation in recreation activities and larger areas impacted by recreation could increase the potential for human-ignited fires. Impacts could range from negligible to moderate. Improved signing and facility management, compliance patrols by law enforcement, and management of outfitters and guides could improve visitor compliance with fire restrictions and provide opportunities to promote a fire prevention message and provide information about fire ecology. Impacts could range from minor to moderate.

Alternative B

Impacts from Travel Management

General impacts from Travel Management would be the same as those described under Alternative A. Alternative B would be the most restrictive on motorized and mechanized access, limiting the potential for human-ignited wildland fires. Impacts could be negligible to moderate.

Impacts from Wilderness Characteristics

In Parashant, the greatest number of acres having wilderness characteristics would be maintained under Alternative B. In the Arizona Strip FO, fewer acres having wilderness characteristics would be maintained under Alternative B than under Alternative C, but more acres would be maintained than under Alternatives D and E. Under Alternative B, fuels management would rely on natural processes (fire use) rather than fuels and vegetation treatments. In Parashant and the Arizona Strip FO, impacts could be moderate. Because fuels treatments are a low priority in Vermilion, impacts would be negligible.

Impacts from Vegetation and Fire and Fuels Management

Fuels and vegetation treatments would be implemented with less aggressive acreage limits, treatment priority criteria, and treatment preferences than under Alternatives C, D, and E. Fewer treatment methods would be authorized than under Alternatives C and D. Prescribed fire, fire use, and manual treatments following minimum tool requirements would be authorized for all wilderness areas classified as Wildland Fire Use based on ecological zone. Treatments would directly affect fuel loads by substantially reducing fuel buildup. As a result, treated acres would be at reduced risk of catastrophic wildland fire or would likely experience lower fire intensity and severity than untreated areas. This would indirectly affect fire suppression. Fewer acres would be impacted than under Alternatives C, D, and E. Fire use would directly impact fuel loads and fire suppression during the incident. Fire use could increase the size of fires that would have otherwise been suppressed. Treatments and fire use could indirectly affect appropriate management response during future ignitions. Impacts would be moderate and both short and long term.

Impacts from Fish and Wildlife

Implementing and maintaining vegetation treatments benefiting wildlife would reduce fuel loads. If wildland fire occurs in maintained areas, fire intensities and negative impacts from fire could be lower than if areas were not maintained. Impacts could range from negligible to major depending on the size and location of treatments. Impacts from building new artificial water sources, requiring pronghorn passable fences, and restricting activities during desert bighorn sheep lambing would be the same as under Alternative A.

Impacts from Special Status Species

Impacts from measures to mitigate fire management actions in special status species habitats, special status species reintroductions, and implementing Peregrine Falcon restrictions would be the same as under Alternative A. Alternative B is the most restrictive for mechanical vegetation treatments, and impacts could be greater than under the other alternatives. Impacts could be negligible to moderate depending on the type of fuels being treated, size of fuels treatment, and threat of wildland fire. Modifying or adding ACECs in the Arizona Strip FO for the protection of special status plants would alter where associated fire suppression and fire use restrictions are required. Not authorizing the use of tracked vehicles for fire suppression in listed plant habitats would impacts the tools available for fighting fire in these areas. Modifying ACECs and not authorizing tracked vehicles could result in negligible to minor impacts because fire does not play a large role in most of these areas.

Impacts from Visual Resources

In Parashant under Alternative B, all but 12 acres would be designated under VRM classes I and II. This would result in major impacts because such VRM designations would preclude some types of treatments in the Monument. In the Arizona Strip FO, Alternative B would designate

fewer acres as VRM classes I and II than under Alternative A, resulting in less widespread impacts, but more impacts that are more widespread compared to Alternatives C, D, and E. Impacts would be moderate because treatments could be planned in the other VRM classes. Fuels treatments are a low priority in Vermilion, so impacts would be negligible for all alternatives. Mitigating impacts for night sky conditions could affect suppression activities, fire camps, and new fire stations or other facilities. Impacts would be negligible.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

Impacts would be similar to Alternative A, although a smaller area would be affected. See corresponding Impacts to Vegetation section for acreage comparisons. Impacts could be negligible to moderate depending on the recovery of these areas, rainfall, and other factors affecting fuel loads, and may vary from year to year.

Impacts from Recreation

General impacts of recreation are described under Alternative A. In Parashant, constructing recreation infrastructure would provide new opportunities to educate the public about fire prevention and fire ecology. Fuels treatments in the Back Roads and Outback Management Units would be limited to natural processes (fire use). Impacts could be minor to moderate.

Alternative C

Impacts from Travel Management

General impacts would be the same as those are described under Alternative A. More than 467 fewer miles of routes would be open in the Monuments than Alternative A, but nearly twice as many acres would be open to motorized and mechanized vehicles in the Arizona Strip FO. This would result in impacts that are more widespread. Impacts could be negligible to moderate.

Impacts from Wilderness Characteristics

General impacts would be similar to those described under Alternative B, although fewer acres would be identified as having wilderness characteristics in Parashant under Alternative C, which would reduce the area of impact. Under Alternative C, natural processes (fire use) would be emphasized, but other tools could be used for fuels projects. Impacts could be moderate. Fuels treatments are a low priority in Vermilion, so impacts would be negligible. The Arizona Strip FO would have the most acres managed for wilderness characteristics under Alternative C, which

would result in the most acres being impacted among the alternatives. Impacts could be moderate.

Impacts from Vegetation and Fire and Fuels Management

Fuels and vegetation treatments would be implemented with acreage limits, treatment priority criteria, and treatment preferences for ecological zones that are more aggressive than under Alternative B, but less aggressive than Alternative D. Alternative C is either the same or less aggressive than Alternative E, depending on the ecological zone and planning area. More acres and treatment methods would be authorized than under Alternative B, fewer acres and treatment methods would be authorized than under Alternative D, and the same or fewer acres and treatment methods would be authorized than under Alternative E, depending on the ecological zone. Prescribed fire, fire use, and manual treatments following minimum tool requirements would be authorized for all wilderness areas classified as Wildland Fire Use based on ecological zone. Treatments would directly affect fuel loads by substantially reducing their levels. As a result, treated areas would be at lower risk for catastrophic wildland fire and would likely experience lower fire intensity and severity than untreated areas. This would indirectly affect fire suppression. More acres would be impacted than under Alternative B, but fewer acres would be impacted than under Alternative D. Fire use would directly impact fuel loads and fire suppression during the incident. Fire use could increase the size of fires that would have otherwise been suppressed and could indirectly affect appropriate management response during future ignitions. Impacts would be moderate to major, depending on the number of acres treated and occurrence of wildland fire in treated areas, and both short and long term.

Impacts from Fish and Wildlife

Impacts would be the same as described under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Visual Resources

In Parashant, more acres would be designated as VRM classes I and II than under Alternatives A, expanding the area where fuels treatments would be limited, but not as widespread as under Alternative B. Impacts would be moderate because treatments could be moved to areas designated as VRM class III. In the Arizona Strip FO, fewer acres are designated as VRM classes I and II under Alternative C than under Alternatives A, B, and E. Impacts would be minor. Fuels treatments are a low priority in Vermilion, so impacts would be negligible for all alternatives. Mitigating impacts to night sky would be the same as Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

Impacts would be similar to Alternative A. See corresponding vegetation management section for acreage comparisons. Impacts could be negligible to moderate, depending on the recovery of these areas, rainfall, and other factors affecting fuel loads, and may vary from year to year.

Impacts from Recreation

General impacts from recreation would be the same as those described under Alternative A. In Parashant, developing interpretive sites could provide new opportunities to educate the public about fire prevention and fire ecology. Fuels treatments in the Back Roads and Outback Management Units would not be limited to natural processes (fire use). Impacts could be minor to moderate.

Alternative D

Impacts from Travel Management

General impacts would be the same as those described under Alternative A. More miles of routes in the Monuments would be open compared to Alternatives B and C, which would result in impacts that are more widespread. In the Arizona Strip FO, new motorized routes could be built to enhance recreation opportunities, and nearly nine times as many acres would be open to motorized and mechanized vehicle use than under Alternative A. Impacts would thus be more widespread and could range from negligible to moderate.

Impacts from Wilderness Characteristics

General impacts would be similar to those described under Alternative B. Under Alternative D, fuels treatments would be accomplished by the most efficient means available. The fewest acres would with wilderness characteristics would be maintained under Alternative D throughout the Planning Area, which would result in the least impacts among the Alternatives, with the exception of Alternative A where no acres would be maintained for wilderness characteristics. Impacts would be minor.

Impacts from Vegetation and Fire and Fuels Management

Fuels and vegetation treatments would be implemented with maximum acreage limits, treatment priority criteria, and treatment preferences for ecological zones. More acres and treatment methods would be authorized than under Alternatives B and C, and the same or more acres and

treatment preferences would be authorized than under Alternative E, depending on the ecological zone. Prescribed fire, fire use, and manual treatments following minimum tool requirements would be authorized for all wilderness areas classified as Wildland Fire Use based on ecological zone. In Parashant, additional steps would be taken to protect old-growth ponderosa pines, rehabilitate treatment areas, and reseed, and helicopters would be authorized for some activities in Alternatives D and E. Treatments would directly affect fuel loads by substantially reducing their levels. As a result, treated areas would have lower risk for catastrophic wildland fire and would likely experience lower fire intensity and severity than untreated areas. This would indirectly affect fire suppression. More acres would be treated than under Alternative B and C, and the same or more acres would be treated under Alternative E, depending on the ecological zone. Fire use would directly impact fuel loads and fire suppression during the incident. Fire use could increase the size of fires that would have otherwise been suppressed, and could indirectly affect appropriate management response during future ignitions. Impacts would be moderate to major, depending on the number of acres treated and occurrence of wildland fire in treated areas, and both short and long term.

Impacts from Fish and Wildlife

Impacts would be the same as described under Alternative B.

Impacts from Special Status Species

Mechanical vegetation treatments would be less restrictive than under alternatives B and E, but more restrictive than under Alternative A. Impacts from other decisions would be the same as described under Alternative B.

Impacts from Visual Resources

In Parashant, more acres would be designated as VRM classes I and II than under Alternative A, expanding the area where fuels treatments would be limited, but not as widespread as under Alternatives B, C, and E. Impacts would be moderate. In the Arizona Strip FO, fewer acres would be designated as VRM classes I and II under Alternative D than under any of the other alternatives, resulting in the smallest area where fuels treatments would be limited. Impacts would be minor. Fuels treatments are a low priority in Vermilion, so impacts would be negligible for all alternatives. Mitigating impacts to night sky would be the same as described Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

Impacts would be similar to those described under Alternative A. See corresponding Impacts to Vegetation section for acreage comparisons. Impacts could be negligible to moderate, depending on the recovery of these areas, rainfall, and other factors affecting fuel loads, and may vary from year to year.

Impacts from Recreation

Impacts would similar to those described under Alternative A.

Alternative E: Proposed Plan

Impacts from Travel Management

General impacts would be the same as described under Alternative A. In the Monuments, impacts would be similar to those described under Alternatives C and D due to similar number/miles of road closures. In the Arizona Strip FO, impacts from open areas would be comparable to Alternative D. Overall impacts could be negligible to moderate.

Impacts from Wilderness Characteristics

General impacts would be similar to those described under Alternative B. Tools available for fuels projects would be the same as under Alternative C. In Parashant, Alternative E would result in maintaining more acres having wilderness characteristics than under in Alternative D, expanding the impacts; however, such impacts would be less extensive compared to Alternatives B or C. Impacts would be minor to moderate. Fuels treatments are a low priority in Vermilion, so impacts would be negligible. In the Arizona Strip FO, impacts would be the same as under Alternative D.

Impacts from Vegetation and Fire and Fuels Management

Fuels and vegetation treatments would be implemented with maximum acreage limits, treatment priority criteria, and treatment preferences for ecological zones. Maximum acres and treatment methods would the same as under Alternative C or D, depending on the ecological zone. Prescribed fire, fire use, and manual treatments following minimum tool requirements would be authorized for all wilderness areas classified as Wildland Fire Use based on ecological zone. The impacts of the Mt. Trumbull restoration project would be the same as under Alternative D. Treatments would directly affect fuel loads by substantially reducing their levels. As a result, treated areas would have a much lower risk of catastrophic wildland fire and would likely experience lower fire intensity and severity than untreated areas. This would indirectly affect fire suppression. Treated acres would be comparable to Alternative C or D, depending on the ecological zone. and could indirectly affect fire suppression, as treated areas may burn less

intensely than untreated areas in wildland fires. Fire use would directly impact fuel loads and fire suppression during the incident. Fire use could increase the size of fires that would otherwise be suppressed. It could indirectly affect appropriate management response during future ignitions. Impacts would be moderate to major, depending on the number of acres treated and occurrence of wildland fire in treated areas, and both short and long term.

Impacts from Fish and Wildlife

Impacts would be the same as described under Alternative B.

Impacts from Special Status Species

Mechanical vegetation treatments would be less restrictive than under Alternatives B and D, reducing impacts. However, mechanical vegetation treatments would be more restrictive than under Alternatives A and C. Impacts from other decisions would be the same as described under Alternative B.

Impacts from Visual Resources

Impacts in Parashant and Vermilion would be the same as under Alternative C. In the Arizona Strip FO, fewer acres would be designated as VRM classes I and II than under Alternatives A and B, reducing the area where fuels treatments would be limited, although such impacts would be more widespread than under Alternatives C and D. Impacts would be moderate. Mitigating impacts to night sky would be the same as Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

Impacts would be similar to those described under Alternative A. See corresponding Impacts to Vegetation section for acreage comparisons. Impacts could be negligible to moderate, depending on the recovery of these areas, rainfall, and other factors affecting fuel loads, and may vary from year to year.

Impacts from Recreation

Impacts would similar to those described under Alternative A.

Cumulative Impacts

The geographic area of analysis for cumulative impacts to wildland fire is the Planning Area and adjacent lands. Actions affecting fire management primarily include factors that affect fuel loads

(e.g., spread of invasive species, vegetation treatments on lands adjacent to the Planning Area, surface disturbing activities, drought conditions, climate change) and factors that provide potential ignition sources (e.g., recreation, OHV use). The continued spread of exotic annual grasses would increase the size and number of fires. Invading tamarisk would continue to increase flammable fuel loads in riparian areas, increasing the risk of stand-replacing fire. Surface disturbing activities would alter plant species composition and density, and promote the spread of invasive plants. Vegetation treatments adjacent to the Planning Area would reduce the chance of wildland fire spreading onto the Planning Area. Drought would impact fuel loads, fire intensities, and the size of wildland fires. Population growth and resulting increases in vehicle and OHV use may increase ignitions.

FISH AND WILDLIFE

Impacts to fish and wildlife resources in the Planning Area from other management programs include loss or alteration of native habitats, increased invasion of noxious weeds and other exotic weed species, decreased water availability, increased habitat fragmentation, changes in habitat and species composition, disruption of species behavior leading to reduced reproductive fitness and/or increased susceptibility to predation, and direct mortality. Surface disturbing actions that alter vegetation characteristics (e.g. structure, composition, and/or production) have the potential to affect habitat suitability for fish and wildlife, particularly where the disturbance removes or reduces cover and/or food resources. Even minor changes to vegetation communities have the potential to affect resident fish and wildlife populations.

Direct impacts to fish and wildlife resources from management activities may result in mortality or displacement of individuals, disturbance resulting in reduced air quality, and alteration of immediate environments through loss of, or changes to, key habitat components. Key habitat components include food availability or quality, cover from predators, insulation from extreme temperatures, nesting/roosting/denning habitat, water availability and quality, and travel corridors. Direct impacts may affect wildlife populations or habitats for the duration of the action, for a few days thereafter, for several growing seasons, or may continue indefinitely where the action results in permanent habitat loss.

Indirect impacts to fish and wildlife resources from management activities typically result from influences of post-disturbance succession, recovery, or rehabilitation of the habitat. These impacts may be long-term and, depending on the severity of the habitat alteration, may change species assemblages (i.e., relative abundances or species composition), species behaviors, or overall population trends, which would benefit some species while negatively affect others.

The direct and indirect impacts of management actions on fish and wildlife resources may vary widely, depending on a variety of factors such as the dynamics of the habitat (e.g. community type, size, shape, complexity, seral state, and condition); season, intensity, duration, frequency, and extent of the disturbance; rate and composition of vegetation recovery; change in vegetation

structure; type of soils; topography and microsites; animal species present; and the mobility of fish or wildlife species (i.e., ability to leave a site or recolonize a site after a disturbance).

Methods and Assumptions

The analysis of potential impacts to fish and wildlife resources is based on the expertise of BLM resource specialists at the Arizona Strip District and the NPS staff at Lake Mead NRA. Combined, these staffs possess an extensive knowledge of fish and wildlife resources within the Planning Area. The impact analysis is also based on review of existing literature and information provided by non-planning team experts in the BLM, NPS, and other agencies.

Quantifying these impacts is difficult due to the lack of monitoring data for most species. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: No changes to fish and wildlife resources would occur, or impacts on individuals, populations, or habitats would be at or below the level of detection. If detected, the impacts would be considered slight.

Minor: Changes to fish and wildlife resources would be measurable, although the changes would be small, short-term (less than seven consecutive days), and local. Mitigation measures would not be necessary.

Moderate: Changes to fish and wildlife resources would be measurable and would have appreciable consequences, although the effect would be relatively local. Mitigating measures would be necessary, but would most likely be successful.

Major: Changes to fish and wildlife resources would be measurable, have substantial consequences, and be noticed regionally. Mitigating measures would be necessary, and their success would be uncertain.

Because some species of fish and wildlife are also considered special status species, only impacts to non-special status fish and wildlife are discussed in this section. Impacts to federally listed, proposed, candidate, State, or BLM sensitive species are addressed in the Impacts to Special Status Species section.

The following assumptions regarding fish and wildlife resources are made:

- Wildlife habitat would be managed for those species identified as priority wildlife and migratory bird species.
- All surface disturbing activities include mitigation to reduce impacts to wildlife resources. Analysis of impacts includes any and all mitigation measures in place

- Wildlife management through habitat restoration and vegetative treatment actions would be based on managing for various states and stages of vegetation based on site potential as described for ecological zone in the Vegetation and Fire and Fuels Management section of Chapter 2.
- Parashant has no streams and no fishery resources.

Impacts to Fish and Wildlife

Impacts to fish and wildlife resources would result from actions proposed under the following resource management programs:

- Transportation and Access
- Wilderness Characteristics (Parashant only)
- Vegetation and Fire and Fuels Management
- Air, Water, and Soil
- Fish and Wildlife
- Special Status Species
- Mineral Resources (Arizona Strip FO only)
- Livestock Grazing
- Recreation
- Lands and Realty

Alternative A: No Action

Impacts from Travel Management

Wildlife may be injured or killed by collisions with vehicles traveling upon the existing transportation system. Impacts from collisions typically affect individuals, though populations may also be adversely affected if the species is rare or collisions are frequent. Birds, reptiles, and small mammals are among the species most commonly hit by vehicles. Generally, collisions with wildlife are infrequent in the Planning Area, with the exception of rabbit kills during periods when they are locally abundant. Because of the reduced traffic volume, impacts from collisions on roads open only for administrative purposes are considered rare. The transportation system also provides increased access, resulting in an increase in the level of human activity, noise, dust, and disturbance. Routes facilitate recreational activities, which may lead to injury or mortality of wildlife, provide a corridor for invasive exotics, fragment habitat, and inhibit breeding activities. Routes also serve as travel corridors for some species and act as effective firebreaks.

Minor, short-term indirect impacts could result from disturbance, noise, and dust from traffic on the designated transportation system. Forage vigor and overall habitat suitability could be reduced from dust settling on vegetation adjacent to roads, reducing the overall habitat suitability for wildlife. Under this alternative, 7,095 miles of routes would be open to motorized use,

including 1,715 in Parashant, 446 in Vermilion, and 4,934 in the Arizona Strip FO, which are the most miles of routes that would be open among the alternatives. As a result, the magnitude of impacts would be greater under Alternative A than under any other alternative.

The construction of new, temporary roads to facilitate project implementation would result in moderate, short-term direct impacts to fish and wildlife resources, as some species would be injured, killed, or displaced during construction and rehabilitation work. Wildlife habitat areas would be temporarily fragmented while the road was in use, an effect that varies in magnitude and intensity by wildlife species. The rehabilitation of temporary roads would have moderate short- and long-term direct and indirect impacts. Short-term direct impacts would include construction noise and dust and disturbance from human activity. Other direct impacts include displacement, loss of habitat, injury, or death of individuals during the rehabilitation phase. Indirect impacts to wildlife habitat include reduced erosion and compaction, and increased infiltration, resulting in a reduction of habitat suitability for some species. Following completion of rehabilitation actions, wildlife would benefit from the reestablishment of vegetation, removal of the source of disturbance, and restoration of the habitat. Indirect habitat impacts include increased vegetation productivity and improved wildlife habitat connectivity.

Impacts from Wilderness Characteristics

No areas are identified to maintain wilderness characteristics under the No Action Alternative. Therefore, no impacts to fish and wildlife resources would result.

Impacts from Vegetation and Fire and Fuels Management

Restoration and Vegetation Treatments: During restoration treatments, impacts to fish and wildlife resources could include disturbance of breeding, feeding, and sheltering activities; temporary or permanent loss of habitat or components; increased habitat fragmentation; increased susceptibility to predation; forced emigration; and/or direct injury or mortality. Reclamation of sites previously disturbed by facility development would have minor, short- and long-term direct and indirect impacts. Short-term direct impacts would include reestablishment of native vegetation for forage and cover. Long-term direct impacts would include reestablishment of vegetation structure. Short-term indirect impacts would include reduced erosion and compaction, and increased infiltration. Long term indirect impacts could include increased vegetation productivity, resulting in increased forage and cover for wildlife. However, the extent of such impacts to wildlife is indeterminable under the No Action Alternative since no limits for vegetation treatments were defined. Refer to Impacts to Vegetation from Vegetation and Fire and Fuels Management for a discussion of impacts from various treatment methods used.

Reclamation actions such as re-contouring, ripping compacted areas, replacing topsoil, seeding, and planting could injure or kill individual animals. The magnitude of anticipated impacts would

vary by the treatment method used, but would generally range from minor to moderate, particularly for animals with low mobility.

Following vegetation treatment, increased invasion of noxious weeds and other exotic weed species, decreased water availability, and long-term changes in habitat and species composition could occur. The duration of these impacts would vary by treatment method, habitat and community type, availability of appropriate seed, and amount and timing of precipitation. Temporary or permanent reductions in water quantity, quality, or access could lead to the same anticipated impacts.

Mechanical and chemical treatment methods could result in localized, short-term impacts to air quality, including fugitive dust, emission/exhaust from equipment, and chemical fumes. Temporary reduction in air quality could lead to reduced fitness, increased susceptibility to predation, or mortality among wildlife species.

In Vermilion, vegetation treatments in riparian areas that result in successful reduction of tamarisk and other invasive exotics would ultimately benefit most riparian dependent species, though treatments would initially have impacts to those species, as described above.

Collection and Use of Native Seed/Use of Non-native Plants: Use of nonnative plant species for re-seeding could impact wildlife habitat by introducing species that could out-compete preferred wildlife forage species or increase the frequency or intensity of fire. Use of nonnative plant species can also help stabilize soils following disturbance when native species are ineffective, cannot be established, or are not available, which would ultimately benefit wildlife. Collection of native seed would not be authorized under this alternative.

Vegetation Products Use/Sale: Use and/or sale of vegetation products in Parashant and Arizona Strip FO, particularly harvest of fuelwood associated with restoration projects, post cutting, collection of dead and downed wood for campfires, Christmas tree harvest, and collection of pinyon nuts would have localized, minor to moderate impacts on wildlife. Impacts would generally be in the form of disturbance to breeding, feeding, or sheltering activities. Impacts resulting from fuelwood harvest associated with restoration projects could lead to long-term or permanent loss of habitat, nest abandonment, emigration, and mortality of individuals, depending upon the species. Removal of vegetation from fuelwood sales could also lead to improved habitat quality if it occurs in unnaturally dense areas and results in an increase in grasses/forbs/shrubs in the understory and an increase in small mammal habitat. Salvage of vegetation that would be destroyed through surface disturbing activities would not be authorized under this alternative.

Use and/or sale of vegetation products would not be authorized in Vermilion. Impacts from free and non-commercial use of these products would be similar in scope and extent to those described above.

Noxious Weed Management. Management of noxious weeds may cause temporary minor to moderate impacts to game and nongame species as a result of herbicide use. Assuming proper application of approved herbicides, it is expected that population-level effects would not occur. Treatments designed to decrease or eliminate noxious weeds would benefit wildlife habitats by reducing or eliminating the chances for dominance of plant species with limited forage or cover values.

Fire Suppression, Use, and Management. The primary impacts of fire to fish and wildlife resources would be the periodic loss or alteration of habitats from large, catastrophic fires or from aggressive fire suppression techniques that alter the natural density, structure, and composition of fire-adapted or fire-threatened habitats. Wildfires impact fish and wildlife resources by altering or reducing available habitat, reducing habitat suitability, changing the structure or composition of the habitat, and direct mortality of individuals. Direct impacts on fish and wildlife resources vary by species.

Depending on species mobility, wildlife would experience impacts from mortality or displacement, disturbance resulting from fire suppression activities, and reduction of air quality from smoke and ash. While small animals (mammals, reptiles and amphibians) are most at risk for mortality because of their limited mobility, occasionally large mammals are killed by severe fast-moving wildfires, typically from smoke inhalation (Smith 2000).

Wildfires may also cause large-scale or intense alterations of habitat components for many fish and wildlife species, which would favor some species and displace others. Immediate post-fire conditions raise light penetration and temperatures on and immediately above and below soil surfaces and can reduce soil moisture, affecting ground-dwelling species (Lyon *et al.* 1978). Burning of cover and destruction of trees, shrubs, and forage modify habitat structure. The loss of small ground cover and charring of larger branches and logs would affect small animals and birds that use these components for nesting, thermal or escape cover, or foraging.

Alterations in terrestrial or riparian habitats would also affect water quality and habitat components for fish and other aquatic species. Wildfires may leave the surrounding soil and accumulated ash vulnerable to erosion and remove shading streamside vegetation, which would increase sedimentation and water temperature. Aquatic species could also be subjected to the direct impacts of increased sedimentation and water temperatures from removal of upland vegetation. The duration, intensity, and scope of these direct impacts depend on the species and the characteristics of the fire.

Wildfires may frequently create more homogeneous habitats within and among vegetation communities, which would reduce or change the assemblage of species occupying these altered habitats. High-intensity fires create large numbers of snags that are normally of high value to many wildlife species (Smith 2000).

In lower elevation vegetation communities, such as in the Mojave Desert Ecological Zone, increases in invasive grass and shrub species have altered these habitats to a point where fires now occur in habitats that are intolerant of fire or fire suppression activities. Wildfire can cause rapid and profound changes in desert scrub habitats, both in the short-term and long-term, because many desert plants are not well adapted to large disturbances by fire (Esque *et al.* 2003). Fires now burn hotter and farther, reducing the natural mosaic pattern typical to desert scrub communities. Wildfires in these fire-intolerant habitats would lead to mortality, displacement, loss of food and shelter, and changes in animal communities for fish and wildlife species not historically impacted by fires or fire suppression activities. While extirpation (100 percent mortality) of entire populations in burned areas is unlikely, direct mortality of wildlife (particularly small animals) in desert fires is fairly common, although highly variable (Esque *et al.* 2003).

Fire suppression activities also have direct and indirect impacts on fish and wildlife species and their habitats. Water taken from small ponds for helicopter bucket drops may affect aquatic organisms by depleting their habitat, removing individuals, or spreading disease or non-native, predatory species (such as bullfrogs) among different water sources. Some terrestrial wildlife, such as nesting raptors, could be disturbed by low-flying aircraft or be struck by water or retardant drops, resulting in injury or chemical contamination. Construction of helispots often results in the felling of trees and snags, which are important habitat components. However, it is sometimes possible to use water drops as an alternative to constructing hand line to control fire movement. Helicopter drops would result in less impact to soil, forest litter, and vegetation than hand line construction and, therefore, would have less impact on wildlife, both in intensity and duration.

Hand line construction would remove and disturb soil and forest litter, possibly affecting animals such as small mammals, amphibians, invertebrates, and ground-nesting birds. The presence of hand line crews in remote locations could directly disturb some wildlife species and introduce unnatural food sources. Removal of forest litter and live vegetation can also lead to soil erosion and increased siltation in adjacent lakes and streams. Any fire suppression action that requires the felling of snags to protect human safety and the integrity of the fire line would potentially affect wildlife by reducing the availability of snags to species such as woodpeckers, squirrels, or some bats. The number of snags lost would vary, depending upon factors such as the type and age of tree stand, its history of fire and/or disease or insect infestation, and the intensity of the fire. Direct and indirect impacts from most suppression techniques would be short-term, temporary, and localized, particularly if sensitive habitats are mitigated or avoided. Suppression actions in the arid desert scrub communities may be longer term or more intense, since these vegetation communities have much longer recovery periods, thereby having a longer term effect on the wildlife species that inhabit them.

Identification of fire use areas would allow for the use of fire as a method for reducing fuel loads and increasing habitat productivity for resource enhancement in specific areas. Fire use would

have similar impacts to wildlife as those described above for wildfire, fire suppression, and vegetation treatments.

Impacts from Soil, Water and Air Resources

Restoration and other types of vegetation treatment actions would have similar effects on fish and wildlife resources to those described above in the Impacts from Vegetation and Fire and Fuels Management section (Restoration and Vegetation Treatments).

Construction of dams, dikes, and other water retention structures would have short-term impacts to wildlife similar to those described for vegetation treatments. The area of disturbance would vary by the action proposed, but generally would average less than five acres per structure.

Acquisition of water rights by the BLM would allow for uniform management of water resources and provide more water for wildlife. Mitigation of adverse effects of fugitive dust resulting from authorized actions would reduce the severity of impacts to fish and wildlife resources.

Impacts from Fish and Wildlife

Fish and wildlife resources would benefit from development of HMPs by providing site-specific objectives and actions to enhance habitat conditions. Restrictions on uses within sensitive or priority wildlife habitats would mitigate or eliminate impacts to wildlife resources.

Initial and supplemental transplants of big game wildlife species may result in minor to moderate long-term impacts to other wildlife species in the area. Competition with local wildlife species for food, water, and habitat cover components could lead to interactions that could be adverse to one or both species. Some individuals could be displaced from preferred habitat areas. Supplementing the big game populations in the Planning Area would increase population levels for that species and provide additional food resources for predators.

Construction of new water developments would permanently displace local wildlife species, depending upon the level of surface disturbance required. Wildlife within the local area could be disturbed from breeding, feeding, and sheltering activities during construction. Water developments may increase opportunities for predation on animals as they drink. However, new water developments benefit most species in the area, including nongame, by allowing animals to colonize new habitat areas that were previously too arid to use. As many as 20 new wildlife water developments would be built throughout the life of this Plan. The average size of each disturbance area surrounding the water development is less than two acres, which means that as much as 40 acres of wildlife habitat could be permanently altered by construction of new artificial water sources during the live of this Plan.

Maintenance of water developments would result in minor disturbance impacts to species that rely on the water. Failure to maintain access to and reliability of water developments could lead

to mortality of individuals, increased predation, and loss of the local population. Approximately 10 wildlife water developments each year are inspected and maintained in the Planning Area.

Rosenstock et al. (2004) and others from AGFD have evaluated the effects of wildlife water developments on wildlife. They concluded that wildlife waters did not necessarily result in increases in local wildlife populations, waters were used by non-target as well as target species, predation levels at water sources was typically no higher than in adjacent areas, water quality was not a concern, and that use of the new water source typically did not result in vegetative habitat degradation. Wildlife drownings are a concern in both developed and undeveloped waters. Tuttle (2005) documented that incidents of bat drownings were higher where water levels were well below the rim; where boards, wires, or other obstructions were present; and where escape ramps were not present. Tuttle's study demonstrated that specific design modifications could be incorporated to minimize or eliminate drowning risks. Most wildlife management agencies, including AGFD, have incorporated such features into wildlife water development plans.

By design, animal damage control actions result in the mortality of individual predators involved in depredation of livestock. Under Alternative A, Animal and Plant Health Inspection Service – Wildlife Services (APHIS-WS) would be encouraged to target only offending animals during their predator control operations. Where aircraft is used to complete the animal damage control actions, minor disturbance impacts would result to local species. Where the potential exists for collisions with aircraft, some individual animals could be injured or killed. Non-target species may be disturbed or have breeding, feeding, or sheltering activities disrupted. Potential prey would benefit from removal of the offending animal. Targeting offending animals would likely reduce the success of predator control efforts.

Wildlife inventories can lead to disturbance impacts that range from minor to major in magnitude. Where aircraft are used, the potential exists for target and non-target individuals to be injured or killed, as a direct result of collision with the aircraft or from disturbance that causes the animal to break cover and run, increasing susceptibility to predation.

Pronghorn antelope would benefit from modifications to fences within their habitat to ensure they would be passable to wildlife.

Desert bighorn sheep would benefit from restrictions on grazing sheep or goats within nine miles of their habitat. Elimination or control of these animals would minimize or eliminate risk of spread of disease between the species that could be detrimental to bighorn.

In Parashant, minor, short-term impacts would result to these species from disturbance of breeding, feeding, and sheltering activities from continued management of Mt. Trumbull as a Watchable Wildlife area for Kaibab squirrels, Merriam's turkey, nongame birds, and mule deer.

Impacts from Special Status Species

Reintroductions of special status species may result in minor to moderate long-term impacts to other wildlife species in the area. Competition with local wildlife species for food, water, and habitat cover components could lead to interactions that could be adverse to one or both species. Some individuals could be displaced from preferred habitat areas. Introducing species long absent from an area or non-endemic species could increase the prey base for predator species.

Fish and wildlife resources would benefit from implementation of use restrictions for special status species by reducing or eliminating disturbances that would otherwise have affected fish and wildlife resources. Implementation of management plans developed for special status species may benefit or be a disadvantage to fish and wildlife, depending upon the nature and timing of the actions and the degree of habitat use overlap between affected wildlife and the special status animals addressed. Inventories of special status species could lead to disturbance effects on a variety of wildlife species.

Restrictions on vegetation treatments in special status species (e.g., desert tortoise or special status plants) habitats would reduce or eliminate potential adverse effects from the treatment to fish and wildlife species, but would also prevent realization of benefits to the species from the action.

Closing roads in listed species habitat could affect wildlife resources depending upon the size of the road to be rehabilitated and the method used. Surface disturbing methods such as ripping and re-contouring could injure or kill individual animals, particularly small species with low mobility. Fencing could impede movement by wildlife species through the habitat and could lead to injury or mortality where animals become entangled in barbed wire. Closing the road or limiting access would benefit wildlife by minimizing opportunities for collisions: disturbance to breeding, feeding, or sheltering activities; and reducing avenues for introduction of invasive exotic species.

Desert Tortoise. In Parashant and the Arizona Strip FO, signing would increase awareness of desert tortoise throughout their habitat, potentially leading to increased visitation for wildlife viewing opportunities. Other wildlife species could experience long-term seasonal impacts from increased visitation in the form of disturbances to breeding, feeding, and sheltering activities related to increased visitation. Impacts could also occur from collection of individual animals, such as snakes and lizards, or from harassment by people or pets. Continuation of management of the Pakoon ACEC would afford some protection to other wildlife species. Fire suppression measures for desert tortoise, such as the presence of a resource advisor, would also benefit other species within the same habitats. Backfiring operations could lead to major impacts in the form of injury or death to low mobility species. Burro management in desert tortoise habitat would also benefit other wildlife species dependent upon scarce resources used by burros. Burro removal actions would have similar impacts on other wildlife as those described for animal damage control under the Impacts from Fish and Wildlife portion of this alternative.

In Arizona Strip FO, maintaining designation of the Beaver Dam Slope, Virgin Slope, and Virgin River Corridor ACECs would continue to provide enhanced management capabilities for desert tortoise by minimizing adverse effects from other resource management programs. Impacts from implementation of restrictions on authorized uses within listed species habitats are described under the resource program where the restrictions apply. These actions should enhance protection of habitat for other species of fish and wildlife in this area.

Impacts from Minerals (Arizona Strip FO only)

For the Arizona Strip FO, impacts would be similar in scope and extent to those described in the Impacts to Special Status Species from Minerals section.

Impacts from Livestock Grazing

Impacts associated with livestock grazing actions are similar to those described in the Impacts to Special Status Species from Livestock Grazing section. More acres would be available for livestock grazing under this alternative than under any of the others. The magnitude of the impacts of livestock grazing is generally less on wildlife species not considered special status, but varies by species. Herbivorous species that compete for forage with livestock may experience greater effects. Livestock may also injure or kill small animals by trampling or colliding with individuals or nests.

Impacts from Recreation

Any form of recreational activity that increases noise and dust could adversely impact fish and wildlife resources by disturbing breeding, feeding, or sheltering activities. Wildlife resources could be impacted from disturbance associated with commercial recreation or competitive events depending upon the nature, location, and duration of the action. Some wildlife may be injured or killed as a result of such activities. Vehicular events have the greatest potential to affect wildlife, particularly those held during the time of year when species are rearing young. Animals could be injured or killed by collisions with vehicles on designated routes. Disturbance could lead to emigration and/or an increased risk of predation. While the No Action Alternative includes provisions to alter recreational activities that affect sensitive areas or species, such provisions would not be enforced until after monitoring had detected the impacts.

Foot traffic through sensitive areas could disturb, injure, or kill wildlife or prevent successful feeding or breeding activities. Recreational shooting activities may increase noise and trash in a localized area and could lead to injury or death of animals. Camping may cause minor to moderate impacts to wildlife resources by disturbing animals, altering or removing habitat, increasing trash and debris in the area, and increasing the risk of wildfire. Animals may ingest foreign food substances that may cause illness or death. Camping activities where pets are allowed to roam freely may also cause impacts to wildlife. Use restrictions on these types of activities should reduce or eliminate adverse effects to wildlife.

Impacts from Lands and Realty

Impacts from issuance of ROWs would vary based upon the nature and purpose of the ROWs. Impacts would be minor in the Monuments as new ROWs or associated actions that had more than a negligible impact on Monument objects or values would not be authorized. For the Arizona Strip FO, impacts would be similar in scope and extent to those described in the section, Impacts to Special Status Species from Lands and Realty Management.

Alternative B

Impacts from Travel Management

The types of impacts from use of the transportation system would be similar to those described under Alternative A. However, due to the increase in number of miles of roads closed or open for administrative use only, impacts would occur over a smaller area than under any other alternative.

Impacts from Wilderness Characteristics

In areas with wilderness characteristics, human imprints that are "substantially noticeable" could be identified for restoration. Under this Alternative, 22 wildlife water developments are located in areas that would be managed for wilderness characteristics under Alternative B. Generally, wildlife catchments are designed and constructed so that the location is camouflaged and screened from view. The likelihood that a wildlife water development would be removed from an area identified with wilderness characteristics as a method of restoration is highly unlikely. Removal of existing artificial waters would have long-term adverse effects on existing wildlife populations dependent upon the water, and would be contrary to wildlife management objectives. A more likely restoration treatment would include camouflage painting, additional vegetative screening, and, in some cases, redesign. Any new wildlife water developments proposed within these areas would be designed to be substantially unnoticeable and would incorporate screening features. In general, construction of new roads would not be allowed in development of new wildlife catchments, though temporary roads could be used. This would limit access for construction and maintenance. Limited access would reduce the frequency of maintenance at the site, potentially increasing the amount of time that water developments are out of service.

Minimum impact fire suppression tactics could lead to adverse impacts to wildlife resources by increasing direct mortality of wildlife and the amount of habitat lost due to fire. Because most acres to maintain wilderness characteristics in the Monuments would be found under Alternative B, the above impacts would be most widespread among the alternatives.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be similar to those described under Alternative A and in the Impacts to Special Status Species from Vegetation and Fire and Fuels Management section. In addition, DFCs and DPC objectives would be used in determining whether vegetation treatments or restoration actions would be authorized. DFCs benefit wildlife and their habitats by emphasizing consideration of these resources in the planning phase of these types of actions. Protection of sensitive wildlife species and habitat areas would be a priority for management. Seasonal restrictions on such actions could be used to mitigate impacts to wildlife.

Collection of Native Seed and Salvage of Vegetation Resources. In Parashant and the Arizona Strip FO, collection of native seed could result in localized, minor impacts to wildlife from disturbance, loss of food or cover resources, and short-term disruption of breeding, feeding, or sheltering activities. The extent of these impacts would vary by species. Salvage of vegetation would have similar impacts on wildlife due to the surface disturbing actions that lead to the salvage.

Riparian Ecological Zone. Managing the Riparian Ecological Zone for minimum disturbance to plant communities would benefit wildlife by minimizing disruption of breeding, feeding, and sheltering activities. No vegetation treatments would occur, though fire use could still be authorized. Impacts to wildlife could result from development of extensive tamarisk-dominated sites. Such sites are characterized by an increase in humidity, salinity, surface temperature, and fire frequency, as well as a decrease in available water.

Pakoon Springs Restoration. Restoration of Pakoon Springs could affect wildlife in a variety of ways depending upon the methods used. Impacts would be similar in scope and magnitude as those described for treatment methods under Alternative A. Approximately 10 acres of lentic riparian habitat could be eliminated and riparian-dependent wildlife species such as migratory birds could be displaced if restoration efforts require removal of the existing ponds.

Cane Springs Restoration. Wildlife resources would benefit from closing this area to grazing by mitigating or eliminating impacts similar to those described for Alternative A under Grazing Management.

In Vermilion, managing the Riparian Ecological Zone for minimum disturbance to plant communities would benefit wildlife by minimizing disruption of breeding, feeding, and sheltering activities. No vegetation treatments would occur, though fire use could still be authorized. Impacts to wildlife could result from development of extensive tamarisk-dominated sites. Such sites are characterized by an increase in humidity, salinity, surface temperature, and fire frequency, as well as a decrease in available water.

In the Arizona Strip FO, no treatments would be authorized or planned under Alternative B. Impacts to wildlife could occur from wildfire and reduction in water resulting from failure to treat invasive exotics.

Ponderosa Pine Ecological Zone. Restoration treatments that lead to improved habitat conditions within ponderosa pine stands would result in higher quality forage, cover, and structure for game and nongame wildlife species. Under this alternative, up to 11,600 acres of ponderosa pine could be treated in Parashant, which is the least amount of acres that would be impacted among the alternatives, and would thus result in the least impacts to wildlife. Using a worst-case analysis, up to 2,320 acres of wildlife habitat in this ecological zone could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low.

Mt. Trumbull Wilderness. Minimum tool use in suppressing wildfires could increase the intensity and/or number of acres burned during restoration treatments. This could increase wildlife mortality. An increase in intensity could also kill more non-target (pre-settlement age) ponderosa pine trees, increasing the number of snags available as wildlife habitat. Impacts would occur on fewer acres under this alternative than under any other alternative.

In the Arizona Strip FO, no treatments would be authorized or planned under this Alternative, so no impacts to wildlife are anticipated.

Great Basin Ecological Zone. Restoration treatments within this ecological zone would enhance localized habitat conditions through the treatment of pinyon-juniper woodlands within sagebrush habitats. Reduced canopy density and increased vegetative diversity in pinyon-juniper woodlands would benefit many wildlife species by increasing available forage and cover. Treatments in sagebrush communities would benefit nongame wildlife species, particularly migratory birds, by reducing sagebrush densities, providing habitat openings, and increasing forage availability. Under this alternative, up to 5,000 acres of sagebrush could be treated in Parashant and up to 20,000 acres in the Arizona Strip FO. Using a worst case analysis, up to 1,000 acres of wildlife habitat in Parashant and up to 4,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low.

In Vermilion, no vegetation treatments would be planned or authorized in sagebrush communities. Fire use would be an option. Impacts from vegetation treatments in pinyon-juniper communities could occur over the smallest area under this alternative than under any other alternative.

Mojave Desert Ecological Zone. In both Parashant and the Arizona Strip FO, no treatments would be authorized or planned under this Alternative, so no impacts to wildlife are anticipated.

Mojave - Great Basin Transition Ecological Zone. In Parashant and the Arizona Strip FO, no treatments would be authorized or planned under this Alternative, so no impacts to wildlife are anticipated.

Colorado Plateau Transition Ecological Zone. In Vermilion and Arizona Strip FO, no vegetation treatments would be planned in this ecological zone, though fire use could still be authorized. No impacts to wildlife are anticipated.

Interior Chaparral Ecological Zone. Black-chinned sparrow and mule deer would benefit from being identified as priority species in this ecological zone due to the increased consideration these species would receive in project design and implementation. No vegetation treatments would be conducted in both Parashant and Arizona Strip FO, except that fire use could be considered. No impacts to wildlife are anticipated.

Plains - Grassland Ecological Zone. Pronghorn antelope and Brewer's and Cassin's sparrow would benefit from being identified as priority species in this ecological zone due to the increased consideration these species would receive in project design and implementation. No vegetation treatments would be conducted in all three planning areas, except that fire use could be considered. No impacts to wildlife are anticipated.

Impacts from Soil, Water and Air Resources

Impacts would be similar in nature and scope to those described under Alternative A.

Impacts from Fish and Wildlife

Impacts would be similar in nature and scope to those described under Alternative A, with the following additions:

Impacts to fish and wildlife resources from restoration and vegetation treatments and maintenance of these areas would be the same as those described under Alternative A, depending upon the method used.

In Parashant and Vermilion, providing access to public lands for the hunting and wildlife viewing would maintain routes through the wildlife habitat. Impacts to fish and wildlife resources from implementation of a transportation system would be the same as those described for Alternative A under Impacts from Travel Management. Identification of priority wildlife species would benefit these species by increasing consideration for these animals in project design and implementation.

Impacts from Special Status Species

Impacts would be similar in nature and scope to those described under Alternative A, with the following additions that apply only to Parashant:

Mechanical treatments would not be authorized in special status species habitats. This would reduce or eliminate potential adverse effects from the treatment to fish and wildlife species, but would also prevent realization of benefits to the species from implementing proactive measures to achieve DFCs.

Identification of priority special status species could benefit fish and wildlife resources depending upon the nature and timing of the actions and the degree of habitat use overlap between affected wildlife and the special status animals addressed.

Relict Leopard Frog. Introducing relict leopard frogs at Pakoon Springs or other locations within Parashant would have a major, permanent impact upon existing wildlife at these locations as site preparation would likely involve large scale, high impact changes. To remove bullfrogs, the ponds at Pakoon Springs would require complete removal of water and vegetation and undergo soil sterilization.

Impacts from Minerals (Arizona Strip FO only)

For the Arizona Strip FO, impacts would be similar to those described under Alternative A.

Impacts from Livestock Grazing

Impacts would be the same as those described under Alternative A. The extent of these impacts would be slightly less under this alternative than under any other due to the reduction in area available for grazing.

Impacts from Recreation

Impacts would be similar to those described under Alternative A.

Impacts from Lands and Realty

In the Monuments, impacts would be the same as those described under Alternative A. In the Arizona Strip FO, impacts could result from land tenure adjustments such as acquisition or disposal and issuance of ROWs, depending upon the type of action that occurs. The magnitude of these impacts would be less under this alternative than under any other since fewer acres would be identified for disposal.

Alternative C

Impacts from Travel Management

Impacts to from management of the transportation system would be similar to those described under Alternative A. However, due to the reduced number of roads open for public use under this alternative, the magnitude of impacts would be less than that of Alternatives A, D, and E, but greater than Alternative B.

Impacts from Wilderness Characteristics

Under this Alternative, 16 wildlife water developments are located in areas that would be managed for wilderness characteristics. Impacts to proposed new and existing wildlife water developments within these areas would be similar in scope and extent to those described under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be similar to those described under Alternatives B, with the following exceptions:

Riparian Ecological Zone. Under this alternative, up to 110 acres of riparian habitat could be treated in Parashant, up to 500 acres in Vermilion, and up to 1,000 acres in the Arizona Strip FO. This is the least amount of acres impacted and would result in fewer impacts to wildlife compared to the other alternatives, with the exception of Alternative B. Even using a worst-case scenario, no long-term loss of riparian habitat would occur because failed treatments would likely result in rapid revegetation by the same invasive exotics intended for removal, The types of impacts would be the same as those described under Alternative A for the various treatment methods used.

Pakoon Springs Restoration: Restoration of processes and function at Pakoon Springs would result in minor, short-term direct impacts including injury, mortality, or removal of individuals or species. Major, long-term indirect impacts could include increased biomass productivity and improvement of wildlife habitat for target species. Approximately 10 acres of lentic riparian habitat could be eliminated and dependent wildlife species such as migratory birds could be displaced if restoration efforts require removal of the existing ponds.

Tassi Ranch and Springs Restoration: Restoration actions at Tassi Springs would result in minor, short-term direct impacts including injury, mortality, or removal of individuals or species. Major, long-term indirect impacts could include increased biomass productivity, and improvement of wildlife habitat for target species. Introduction of relict leopard frogs or other special status species could limit the use of restoration tools that adversely affects other fish or wildlife species, but could also delay restoration.

Cane Springs Restoration: Fish and wildlife resources would benefit from closing this area to grazing by mitigating or eliminating impacts similar to those described under Alternative B, Livestock Grazing. Developing an interpretive site could result in minor, short- and long-term impacts to wildlife by increasing visitation to the site, which would cause increases in disturbance, trampling, compaction and minor erosion of pathways and trails, and the likelihood of fire.

Paria River Invasive Plant Species Removal: Impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Impacts could occur over a larger area under this alternative than under Alternative B, but less than under all other alternatives.

In the Arizona Strip FO, restoration treatments within the Riparian Ecological Zone would have similar effects as those described under Alternative A for the various treatment methods used. Due to the limited acreage available for treatment, the magnitude of these impacts would be less than under any other alternative except Alternative B.

Ponderosa Pine Ecological Zone. In Parashant, the types of impacts would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 16,200 acres of ponderosa pine could be treated in Parashant and up to 1,000 acres in the Arizona Strip FO. This is the least amount of acres impacted among the alternatives, with the exception of Alternative B. Using a worst-case analysis, up to 3,240 acres of wildlife habitat in Parashant and 200 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low.

Mt. Trumbull Wilderness: The types of impacts would be the same as those described under Alternative A for the various treatment methods used, although the potential of impacts would not occur over such a large area. However, impacts could occur over a larger area under this alternative than under Alternative B.

Great Basin Ecological Zone. The types of impacts from vegetation treatments in sagebrush communities would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 25,000 acres of Great Basin sagebrush could be treated in Parashant, up to 50,000 acres in Vermilion, and up to 100,000 acres in the Arizona Strip FO. This is the least amount of acres impacted among the alternatives and would result in fewer impacts to wildlife, with the exception of Alternative B . Using a worst-case analysis, up to 5,000 acres of wildlife habitat in Parashant, up to 10,000 acres in Vermilion, and up to 20,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low because few treatments ever achieve a 100 percent kill of target species and sagebrush tends to re-establish itself on these sites within a few years.

The types of impacts from vegetation treatments in pinyon-juniper communities would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 41,000 acres of Great Basin pinyon-juniper could be treated in Parashant and up to 30,000 acres each in Vermilion and the Arizona Strip FO. This is the least amount of acres impacted among the alternatives and would result in fewer impacts to wildlife, with the exception of Alternative B. Using a worst-case analysis, up to 8,200 acres of wildlife habitat in Parashant and up to 6,000 acres each in Vermilion and the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low since pinyon juniper habitat is already considered a stable, undesirable plant community.

Mojave Desert Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A, Vegetation and Fire and Fuels Management, Restoration and Vegetation Treatments. Under this alternative, up to 70,000 acres of Mojave Desert habitat could be treated in Parashant and up to 5,000 acres in the Arizona Strip FO. This is the least amount of acres impacted among the alternatives and would result in fewer impacts to wildlife, with the exception of Alternative B. Using a worst-case analysis, up to 14,000 acres of wildlife habitat in Parashant and up to 1,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low since vegetation treatments in this community would be limited in size due to sensitivity over desert tortoise needs.

Mojave-Great Basin Transition Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 150,000 acres of Mojave Great Basin Transition habitat could be treated in Parashant and up to 5,000 acres in the Arizona Strip FO. This is the least amount of acres impacted among the alternatives and would result in fewer impacts to wildlife, with the exception of Alternative B. Using a worst-case analysis, up to 30,000 acres of wildlife habitat in Parashant and up to 1,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low.

Colorado Plateau Transition Ecological Zone. Impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 5,000 acres could be treated each in Vermilion and the Arizona Strip FO. This is the least amount of acres impacted among the alternative and would result in fewer impacts to wildlife, with the exception of Alternative B. Using a worst case analysis, up to 1,000 acres each in Vermilion and the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low.

Interior Chaparral Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 1,500 acres of Interior Chaparral habitat

could be treated in Parashant and up to 1,000 acres in the Arizona Strip FO. This is the least amount of acres impacted among the alternatives and would result in fewer impacts to wildlife, with the exception of Alternative B. Using a worst-case analysis, up to 300 acres of wildlife habitat in Parashant and up to 200 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low.

Plains-Grassland Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 50 acres of Plains Grassland habitat could be treated in Parashant, up to 5,000 acres in Vermilion, and up to 50,000 acres in the Arizona Strip FO. This is the least amount of acres impacted among the alternatives and would result in fewer impacts to wildlife, with the exception of Alternative B. Using a worst-case analysis, up to 10 acres of wildlife habitat in Parashant, up to 1,000 acres in Vermilion, and up to 10,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low.

Impacts from Soil, Water and Air Resources

Impacts would be similar in nature and scope to those described under Alternatives A.

Impacts from Fish and Wildlife

Impacts from wildlife management actions would be similar to those described under Alternatives B, except for the following decisions:

Under Alternative C, APHIS-WS would be encouraged to target only offending animals in predator control actions, but could also be asked to conduct proactive control to enhance the success of wildlife transplants or augmentations. Impacts to wildlife resources would be similar in scope but greater in magnitude than those described for Alternative A. Targeting offending animals would likely reduce the success of predator control efforts.

In Parashant, new Watchable Wildlife areas would be proposed at Tassi Spring, Cane Spring, Pakoon Spring, and Oak Grove. Impacts to wildlife resources would be similar to those described under Alternative A, but would occur in more areas across the planning area. In addition, Kaibab squirrel populations could be augmented in the Mt. Trumbull area. This action would benefit the species by increasing numbers and providing additional breeding opportunities for existing individuals.

In Vermilion, wildlife could be disturbed, injured, or killed by additional visitation caused by promoting a Watchable Wildlife area for California Condor viewing in the House Rock Valley.

In the Arizona Strip FO, promoting five new Watchable Wildlife areas could increase the level of disturbance to wildlife at these locations and could lead to minor to moderate long-term impacts from disruption of breeding, feeding, and sheltering activities.

Impacts from Special Status Species

In Vermilion and the Arizona Strip FO, impacts would be similar to those described under Alternative A. In Parashant, impacts would also be similar to those described under Alternative A, except for the following decisions that apply:

Mechanical treatments would not be authorized in special status plant habitats. This would reduce or eliminate potential adverse effects from the treatment to fish and wildlife species, but would also prevent realization of benefits to the species from the action.

Burrowing Owl. Augmenting existing Burrowing Owl populations and installing artificial nest burrows in the Pakoon Basin would have minor short-term impacts to wildlife species from surface disturbing actions associated with burrow construction. These impacts would not likely exceed two acres for each group of 16 Burrowing Owls released, or less than 10 acres total over the life of the Plan. Where Burrowing Owl populations are successfully established, rodents and other prey species would be impacted. While individual prey species would be killed, given the proliferation of rodents in these areas, the long-term impacts to rodent populations would be minor or negligible. Where Burrowing Owls preyed upon desert tortoise young, long-term adverse effects to the species would occur (see Impacts to Special Status Species section).

Impacts from Minerals (Arizona Strip FO only)

In the Arizona Strip FO, impacts to fish and wildlife resources would be would be similar to those described under Alternative A.

Impacts from Livestock Grazing

Impacts would be similar to those described under Alternative A, although impacts would not be as widespread or as long in duration due to limited acreage available for grazing or reduced season of use

Impacts from Recreation

Impacts would be similar in nature and scope to those described under Alternative A.

Impacts from Lands and Realty

For the Monuments, impacts would be similar in nature and scope to those described under Alternative A. For Arizona Strip FO, impacts would be similar in nature and scope to those described under Alternative B.

Alternative D

Impacts from Travel Management

Impacts would similar to those described under Alternative A, but would not cover such a large area due to more miles closed and fewer miles open to the public. However, impacts would occur over a larger area than under the other action alternatives (B, C, and E).

Impacts from Wilderness Characteristics

Under this Alternative, eight wildlife water developments are known to occur in areas that would be managed for wilderness characteristics. Impacts to proposed new and existing wildlife water developments within these areas would be similar in scope and extent to those described for Alternative B. Wildlife resources could be impacted from disturbance associated with non-motorized competitive events. Depending upon the nature, location, and duration of the event, some wildlife may be injured or killed.

Impacts from Vegetation and Fire and Fuels Management

Impacts to fish and wildlife resources from vegetation management actions would be similar to those described in Alternatives B, except for the following decisions:

Riparian Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 220 acres could be treated in Parashant, up to 1,560 acres in Vermilion, and up to 5,000 acres in the Arizona Strip FO. This is the greatest amount of acres impacted among the alternatives and would result in greatest magnitude of impacts to wildlife. Even in the event of failed vegetation treatment projects, no riparian habitat would be permanently lost over the life of the plan. This is because invasive exotics such as tamarisk and Russian olive would revegetate quickly in areas where target plant communities failed to establish.

Pakoon Springs Restoration: Impacts would be similar to those described under Alternative C. Developing an interpretive site could result in minor, short- and long-term impacts to vegetation by increasing visitation to the site, which would result in increased disturbance and risk of trampling, compaction and minor erosion of pathways and trails, and increased likelihood of fire. Approximately 10 acres of lentic riparian habitat could be eliminated and dependent wildlife species such as migratory birds displaced if restoration efforts require removal of the existing ponds.

Tassi Springs and Ranch Restoration: Impacts would be similar to those described under Alternative C.

Cane Springs Restoration: Impacts would be similar to those described under Alternative C.

Paria River Invasive Plant Species Removal: The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for each treatment method used. Impacts could occur over a larger area than under any other alternative.

Ponderosa Pine Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for each of the various treatment methods used. Under this alternative, up to 20,800 acres could be treated in Parashant and up to 3,800 acres in the Arizona Strip FO. This is the greatest amount of acres impacted among the alternatives and would result in the greatest magnitude of impacts to wildlife. Using a worst-case analysis, up to 4,160 acres of wildlife habitat in Parashant and up to 760 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low.

Mt. Trumbull Wilderness – The types of impacts would be the same as those described under Alternative A for the various treatment methods used. Impacts could occur over a larger area under this alternative than under any other alternative with the exception of Alternative A.

Great Basin Ecological Zone. The types of impacts from vegetation treatments in sagebrush communities would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 50,000 acres could be treated in Parashant, up to 100,000 acres in Vermilion, and up to 200,000 acres in the Arizona Strip FO. This is the greatest amount of acres impacted among the alternatives and would result in the greatest level of impacts to wildlife. Using a worst-case analysis, up to 10,000 acres of wildlife habitat in Parashant, up to 20,000 acres in Vermilion, and up to 40,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low since sagebrush communities regenerate quickly in the Planning Areas.

The types of impacts from vegetation treatments in pinyon-juniper communities would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 136,000 acres could be treated in Parashant, up to 50,000 acres in Vermilion, and up to 100,000 acres in the Arizona Strip FO. This is the greatest amount of acres impacted among the alternatives and would result in the greatest level of impacts to wildlife. Using a worst-case analysis, up to 27,200 acres of wildlife habitat in Parashant, up to 10,000 acres in Vermilion, and up to 20,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low since pinyon-juniper communities regenerate quickly in the Planning Areas.

Mojave Desert Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 80,000 acres could be treated in Parashant

and up to 10,000 acres in the Arizona Strip FO. This is the greatest amount of acres impacted among the alternatives and would result in the greatest level of impacts to wildlife. Using a worst-case analysis, up to 16,000 acres of wildlife habitat in Parashant and 2,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low since concerns for impacts to desert tortoise generally limit the size of treatment areas in these habitats.

Mojave-Great Basin Transition Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 180,000 acres could be treated in Parashant and up to 30,000 acres in the Arizona Strip FO. This is the greatest amount of acres impacted among the alternatives and would result in the greatest level of impacts to wildlife. Using a worst-case analysis, up to 36,000 acres of wildlife habitat in Parashant and 6,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low.

Colorado Plateau Transition Ecological Zone. Impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 30,000 acres could be treated each in Vermilion and the Arizona Strip FO. This is the greatest amount of acres impacted among the alternatives and would result in the greatest level of impacts to wildlife. Using a worst-case analysis, up to 6,000 acres of wildlife habitat each in Vermilion and the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low.

Interior Chaparral Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 2,500 acres could be treated in Parashant and up to 5,000 acres in the Arizona Strip FO. This is the greatest amount of acres impacted among the alternatives and would result in the greatest level of impacts to wildlife. Using a worst-case analysis, up to 500 acres of wildlife habitat in Parashant and 1,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low.

Plains-Grassland Ecological Zone. The types of impacts from vegetation treatments in this ecological zone would be the same as those described under Alternative A for the various treatment methods used. Under this alternative, up to 110 acres could be treated in Parashant, up to 10,000 acres in Vermilion, and up to 100,000 acres in the Arizona Strip FO. This is the greatest amount of acres impacted among the alternatives and would result in the greatest level of impacts to wildlife. Using a worst-case analysis, up to 22 acres of wildlife habitat in Parashant, up to 2,000 acres in Vermilion, and up to 20,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low.

Impacts from Soil, Water and Air Resources

Impacts would be similar in nature and scope to those described under Alternatives A.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative C.

Impacts from Special Status Species

Impacts in Vermilion and the Arizona Strip FO would be the same as described under Alternative A. Impacts in Parashant would be similar to those described under Alternatives C, with the following exceptions:

Mechanical treatments would not be authorized in listed or proposed species habitats. This would reduce or eliminate potential adverse effects from the treatment to fish and wildlife species, but would also prevent realization of benefits to the species from the action.

Desert Tortoise. Revocation of the Pakoon ACEC would have a negligible effect on wildlife management within the area. The Grand Wash portion of the former ACEC would be available for grazing, reducing or eliminating some of the protective measures afforded other species. Such actions could include various types of restoration or vegetation treatment actions that would be restricted or not authorized within the ACEC. These effects would be negligible as Mojave Desert habitats receive substantial protections as a result of being within the Monument, within the critical habitat boundary for desert tortoise, and as part of the wildlife habitat area (WHA).

Burrowing Owl. Impacts to wildlife resources as a result of implementation of Burrowing Owl decisions under Alternative D would be the same as those described under Alternative C.

Impacts from Minerals (Arizona Strip FO only)

In the Arizona Strip FO, impacts would be similar to those described under Alternative A.

Impacts from Livestock Grazing

Impacts would be similar in nature and scope to those described under Alternative A. The extent of adverse effects would be less than that of Alternative A due to fewer acres available for grazing; however, impacts would be more extensive under Alternative D compared to the other action alternatives due to more acres available for grazing.

Impacts from Recreation

In Parashant and the Arizona Strip FO, impacts would be similar in nature and scope to those described under Alternative A. In Vermilion, impacts would be similar to those described under Alternative C.

Impacts from Lands and Realty

For the Monuments, impacts would be similar to those described under Alternative A. For Arizona Strip FO, impacts would be similar to those described under Alternative B.

Alternative E: Proposed Plan

Impacts from Travel Management

Overall impacts would be similar to those described under Alternative A, although impacts would be less widespread due to an overall decrease in the miles of routes open to the public. In Parashant, 1,404 miles would remain open for motorized use by the public, a decrease of 311 miles (18 percent) over Alternative A. In Vermilion, 377 miles would remain open for motorized use by the public, a decrease of 69 miles (15 percent) over Alternative A. In the Arizona Strip FO, 2 miles of routes would be closed initially in the Ferry Swale area, so the magnitude of the impacts to wildlife would be similar to Alternative A. However, in the future, route designation decisions would be made and it is likely that some additional roads would be closed.

Impacts from Wilderness Characteristics

Under this Alternative, 18 wildlife water developments are known to occur within areas that would be managed for wilderness characteristics. Impacts to proposed new and existing wildlife water developments within these areas would be similar in scope and extent to those described under Alternatives B and D.

Impacts from Vegetation and Fire and Fuels Management

Impacts to fish and wildlife resources from vegetation management actions would be similar to those described under Alternative B, except for the following decisions:

Riparian Ecological Zone. Impacts would be similar to those described for treatments in riparian areas under Alternative A. The magnitude of impacts in Parashant would be similar to those described under Alternative C. The magnitude of impacts in Vermilion and the Arizona Strip FO would be similar to those described under Alternative D. Even failed treatment projects would not result in permanent loss of riparian habitat since invasive exotics readily re-establish themselves in this ecological zone.

Pakoon Springs Restoration. Impacts would be similar to those described under Alternative D.

Cane Springs Restoration. Impacts would be similar to those described under Alternative D.

Paria River Invasive Plant Species Removal: Impacts would be the same as those described under Alternative D.

Ponderosa Pine Ecological Zone. Impacts to ponderosa pine habitats would be similar to those described for vegetation treatments in this ecological zone under Alternative A. Up to 20,800 acres of this habitat could be treated in Parashant and up to 3,800 acres in the Arizona Strip FO. Using a worst case analysis, up to 4,160 acres of wildlife habitat in Parashant and 760 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low. The magnitude of impacts to wildlife would be similar to those described for Alternative D.

Mt. Trumbull Wilderness. In Parashant, impacts would be the same as those described under Alternative D.

Great Basin Ecological Zone. Impacts would be similar to those described for treatments in sagebrush communities under Alternative A. The magnitude of impacts to wildlife in Parashant would be similar to those described under Alternative C, while the magnitude of impacts in Vermilion and the Arizona Strip FO would be similar to those described under Alternative D. Using a worst case analysis, up to 5,000 acres of wildlife habitat in Parashant, up to 20,000 acres in Vermilion, and up to 40,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low since few treatments result in 100 percent kill of the target species and sagebrush readily re-establishes itself in these habitats.

Impacts to pinyon-juniper communities would be similar to those described for vegetation treatments in this ecological zone under Alternative A. The magnitude of impacts to wildlife within all three planning areas would be similar to those described for Alternative D. Using a worst-case analysis, up to 27,200 acres of wildlife habitat in Parashant, up to 10,000 acres on Vermilion, and up to 20,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low as pinyon-juniper readily re-establishes itself in this zone.

Mojave Desert Ecological Zone. Impacts to Mojave Desert habitats would be similar to those described for vegetation treatments in this ecological zone under Alternative A. The magnitude of impacts to wildlife in Parashant would be similar to those described for Alternative C. The magnitude of impacts to wildlife in the Arizona Strip FO would be similar to those described for Alternative D. Using a worst-case analysis, up to 14,000 acres of wildlife habitat in Parashant and up to 2,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment

projects. The probability for this occurrence is considered low since treatment projects in this zone are typically limited in size and extent to limit potential impacts to desert tortoise.

Mojave - Great Basin Transition Ecological Zone. Impacts from vegetation treatments in this ecological zone would be similar to those described under Alternative A. Impacts to wildlife in Parashant would be similar to those described under Alternative C. The magnitude of impacts to wildlife in the Arizona Strip FO would be similar to those described for Alternative D. Using a worst-case analysis, up to 30,000 acres of wildlife habitat in Parashant and up to 6,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low.

Colorado Plateau Transition Ecological Zone: Impacts in this ecological zone would be similar to those described for vegetation treatments under Alternative A. The magnitude of impacts to wildlife in Vermilion and the Arizona Strip FO would be similar to those described for Alternative D. Using a worst-case analysis, up to 6,000 acres of wildlife habitat each in Vermilion and the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low.

Interior Chaparral Ecological Zone. Impacts to Interior Chaparral habitats would be similar to those described for vegetation treatments in this ecological zone under Alternative A. Impacts to wildlife in Parashant would be similar to those described under Alternative C. The magnitude of impacts to wildlife in the Arizona Strip FO would be similar to those described under Alternative D. Using a worst-case analysis, up to 300 acres of wildlife habitat in Parashant and up to 200 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low.

Plains - Grassland Ecological Zone. Impacts to Plains-Grassland habitats would be similar to those described for vegetation treatments in this ecological zone under Alternative A. The magnitude of impacts to wildlife in all three planning areas would be similar to those described for Alternative D. Using a worst case analysis, up to 22 acres of wildlife habitat in Parashant, up to 2,000 acres in Vermilion, and up to 20,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low.

Impacts from Soil, Water and Air Resources

Impacts would be similar in nature and scope to those described under Alternative A.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative C.

Impacts from Special Status Species

In Vermilion and the Arizona Strip FO, impacts would be similar to those described under Alternative A. In Parashant, impacts would be similar to those described under Alternative D, with the following exceptions

Desert Tortoise. Revocation of the Pakoon ACEC would have a negligible effect on wildlife management in the Mojave Desert. Management prescriptions from the former ACEC would be applied across the larger WHA.

Burrowing Owl. Burrowing Owl augmentations would not occur under Alternative E, making potential impacts similar to those described under as in Alternative A.

Impacts from Livestock Grazing

Impacts would be similar in nature and scope to those described under Alternative A. In Parashant, the magnitude of adverse effects would be less than that of Alternatives A and D, but greater than for other alternatives due to the amount of lands made available to grazing. In Vermilion, impacts would be similar to those described under Alternative B. In the Arizona Strip FO, impacts would be similar to those described under Alternative D.

Impacts from Recreation

Impacts would be similar in nature and scope to those described under Alternative A.

Impacts from Lands and Realty

For the Monuments, impacts would be similar in nature and scope to those described under Alternative A. For Arizona Strip FO, impacts would be similar in nature and scope to those described under Alternative B.

Cumulative Impacts

The geographic area for analysis of cumulative impacts to fish and wildlife resources is the three planning areas. Development pressure exists throughout the southwestern U.S., particularly in and adjacent to sources of water. As a result, community expansion has had negative impacts on fish and wildlife resources.

Community expansion has also led to increased pressure for water and developable lands. Land disposals have reduced available wildlife habitat outside of ACECs/critical habitat in the Mojave Desert portions of the Planning Areas by up to 400 acres since 1973. Issuance of ROWs outside of ACECs/critical habitat has also reduced these habitats by as much as 1,859 acres over the same time period. Acquisition of sensitive habitats within ACECs/critical habitat has increased protection of the species by shifting management emphasis toward conservation.

Demand for water for industrial, irrigation, and culinary use has had major long-term impacts on fish and wildlife resources. Disruptions of flow regimes from dams and diversions have altered habitat for fish and riparian dependent species. Reductions in water quality have had similar long-term impacts. Introduction of non-native plants and animals have resulted in impacts from competition for resources, trampling, predation, injury, and death. Tamarisk invasion in riparian areas has resulted in reductions of flow for native fishes, reductions in the overall size of the vegetative community, increased temperature and salinity, and increased risk of fire.

Mineral development has led to reduction of habitat quality and physical disturbance in a variety of habitats. Wildfires have reduced available Mojave Desert habitat by many thousands of acres through conversion of the vegetation from native communities to exotic annual grasses. Livestock grazing related activities has increased the probability of some terrestrial wildlife species being trampled. During years of drought and/or low productivity, livestock grazing has reduced forage availability for species that share habitats with them. Areas made unavailable to grazing are immune from such impacts, while seasonal grazing restrictions limit both the extent and duration of impacts. Some 128,005 acres of desert tortoise habitat were unavailable to livestock grazing since 1996. An additional 144,027 acres of desert tortoise habitat have seasonal grazing restrictions.

Recreational pursuits, particularly OHV use, have caused disturbance to most all species and their habitats. With the increase in local populations has come a dramatic increase in the level of OHV use, resulting in increased disturbance, injury, and mortality to fish and wildlife, particularly ground dwelling species with low mobility. Transportation corridors exist through the habitat of virtually all species found within the Planning Areas. Impacts vary by species and by the location, level of use, and speed of travel over the road. In some areas the habitat has been rendered unusable to species with narrow tolerances by long-term recreational use.

Implementation of plan decisions is expected to improve conditions for most species of fish and wildlife by focusing management attention and reducing or eliminating actions that lead to impacts.

Impacts from livestock grazing on Mojave Desert species would be minimized because more of this area would be unavailable for grazing. Water use in the region would continue to increase, affecting flows in the Virgin River, and continuing to cause a decline in populations of native fish and riparian dependent species. Efforts to remove or reduce tamarisk would increase in scope and size, leading to localized impacts but ultimately increasing the size and quality of habitat for riparian dependent species. Reduction in tamarisk would also increase flows for Virgin River fishes.

Increased demand for land for community services and recreational uses would occur, particularly in the area around Mesquite and Littlefield/Beaver Dam. Assuming land ownership follows the Proposed Plan, impacts would continue to increase at modest levels. The demand for new lands for development would likely lead to development of one or more Habitat Conservation Plans.

SPECIAL STATUS SPECIES

Special status species include both plants and animals that are federally or state listed, proposed or candidates for these lists, or included on the BLM and NPS sensitive species list. Because many special status species have very narrow habitat requirements and low tolerance for change, even small modifications to vegetation in their environment can lead to pronounced effects on the species. As a result, the majority of impacts to these species and their habitat have previously been discussed in the Vegetation and Fish and Wildlife sections.

Impacts to special status species from other management programs in the Planning Area include loss or alteration of native habitats, increased invasion of noxious weeds and other exotic weed species, decreased water availability, increased habitat fragmentation, changes in habitat and species composition, disruption of species behavior leading to reduced reproductive fitness and/or increased susceptibility to predation, and direct mortality of individuals. Surface disturbing actions that alter vegetation characteristics (e.g. structure, composition, and/or production) have the potential to affect habitat suitability for special status plants or animals, particularly where the disturbance removes or reduces cover and/or food resources. Even minor changes to vegetation communities have the potential to affect special status species.

Direct impacts to special status species from management activities may result in mortality or displacement of individuals, disturbance due to reduced air or water quality, and alteration of immediate environments through loss of or changes to key habitat components. Positive or negative effects are possible. Key habitat components include food availability or quality, cover from predators, thermal refugia, nesting/roosting/denning habitat, water availability and quality, travel corridors, and the like. Direct impacts may affect individuals, populations, or habitats for

the duration of the action, for a few days thereafter, for several growing seasons, or may continue indefinitely where the action results in permanent habitat loss.

Indirect impacts to special status species from management activities typically result from influences of post-disturbance succession, recovery, or rehabilitation of the habitat. Positive or negative effects are possible. These impacts may be long-term, depending on the severity of the habitat alteration, and may change species assemblages (relative abundances or species composition), species behaviors, or overall population trends, benefiting some species and negatively affecting others.

Methods and Assumptions

To analyze the potential effects of the alternatives on special status species, information was gathered from existing inventories, recovery plans, conservation agreements, State Heritage database files, relevant scientific literature, computer habitat models, and other sources identifying the potential distribution of these species in and adjacent to the Planning Area. The analysis is also based on professional expertise of BLM specialists at the Arizona Strip FO and the NPS staff at Lake Mead NRA, knowledge of the area, and a review of the relevant scientific literature. For most species described in Chapter 3, habitat inventories have been completed and distributions within the Planning Area have been mapped.

To comply with Section 7 of the Endangered Species Act, a Biological Assessment (BA) will be prepared to address impacts and mitigating measures on threatened and endangered species. See Appendix 2.E

In determining impacts, BLM and NPS staff considered how the effects of the action would affect listed or proposed species known or suspected to occur in an area. Impacts were measured against information about threats found in the Federal Register notice describing the listing of the species and the potential for the action to modify designated or proposed critical habitat. Direct and indirect impacts were considered together with impacts of activities that are interrelated or interdependent.

Impacts are quantified where possible. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: The impacts on special status wildlife and/or plants would be at or below the level of detection, and the changes would be so slight that they would not be of any measurable or perceptible consequence to individuals or the population as a whole.

Minor: The impacts on special status wildlife and/or plants would be detectable but localized, small, and of little consequence to the population of any species. Mitigating measures, if needed to offset adverse effects, would be simple and successful.

Moderate: The impacts on special status wildlife and/or plants would be readily detectable and localized, with potential consequences at the population level. Mitigating measures, if needed to offset adverse effects, would be extensive and would probably be successful.

Major: The impacts on special status wildlife and/or plants would be obvious and would result in substantial consequences to the populations in the region. Extensive mitigating measures would be needed to offset adverse effects, and their success would not be guaranteed. Actions that would likely result in effects to special status species of this severity would not be authorized or undertaken.

The duration of impacts to special status species was defined as follows:

Short-term: The effect would generally last less than a single year or season.

Long-term: A change in a resource or its condition would last longer than a single year or season.

The following assumptions regarding special status species are made:

- Special status species habitat would be managed for the benefit of those species as a priority over other resources allocations and uses.
- All surface disturbing activities would include mitigation to reduce impacts to special status species and their habitat. Conservation measures developed for each listed or proposed species (Appendix 2.E) would be applied to any proposed project within the habitat of that species. Analysis of impacts and determinations of effects would include any and all mitigation and conservation measures.
- While most surface disturbing activities would not be authorized in special status species habitats, the planning decisions do not prohibit such actions. Inclusion of these decisions reflects the desire for an adaptive approach and allows for use of techniques that might be developed in the future. As a result, the analysis of environmental consequences and the determination of effects to special status species provide a worst case approach. The analysis includes implementation of decisions that would not typically be applied to special status species habitats.
- Prior to any surface disturbing activity, a special status species review would occur to determine whether any such species would be present in the project area.
- Any determination of May Affect would trigger ESA Section 7 consultation with the USFWS. A separate biological assessment would be prepared for this consultation.

- Four listed species are found in Parashant: desert tortoise (threatened), Bald Eagle (threatened), Mexican Spotted Owl (threatened), and California Condor (10J, proposed). Other special status species present are discussed in Chapter 3.
- Four listed species are found in Vermilion: Bald Eagle (threatened), Mexican Spotted Owl (threatened), California Condor (10J, proposed), and Welsh's milkweed (endangered). Other special status species present are discussed in Chapter 3.
- Twelve listed species are found in the Arizona Strip FO: desert tortoise (threatened), woundfin minnow (endangered), Virgin chub (endangered), Bald Eagle (threatened), Southwestern Willow Flycatcher (endangered), Yuma Clapper Rail (endangered), California Condor (10J, proposed), Mexican Spotted Owl (threatened), Brady pincushion cactus (endangered), Holmgren milk-vetch (endangered), Jones' cycladenia (threatened), and Siler pincushion cactus (threatened). Other special status species present are discussed in Chapter 3.

Impacts to Special Status Species

Impacts to special status species in the Planning Area would result from actions proposed under the following resource management programs:

- Travel Management
- Vegetation and Fire and Fuels Management
- Air, Water, and Soil
- Fish and Wildlife
- Special Status Species
- Minerals (Arizona Strip FO only)
- Livestock Grazing
- Recreation
- Lands and Realty

Alternative A: No Action

Impacts from Travel Management

Roads affect special status species by fragmenting habitat; reducing available habitat for breeding and foraging activities; providing access corridors for weed invasion, hunting, pollution, wildfires, and habitat-altering projects; increasing erosion; and increasing opportunities for collisions and variety of other disturbances that change wildlife movement and habitat use. Under this alternative, 7,095 miles of routes would be open to motorized use, including 1,715 in Parashant, 446 in Vermilion, and 4,934 in the Arizona Strip FO. As a result, the magnitude of impacts would be greater than under any other alternative.

It is not sufficient to merely compare total miles of routes when determining impacts as roads are not all equal in their effects on special status species due to variables such as road widths, location, and traffic type, speed, and volume. In general, the lower the speed and volume of traffic, the lower the likelihood of collision. Most scientific literature concerning the effects of transportation systems on wildlife species are based on paved roads with high traffic volumes that travel at high rates of speed. However, only a few roads in the Arizona Strip FO are paved and none of the roads within the Monuments are paved, and there are no plans to pave or authorize paving of any roads in the Monuments through the life of this Plan. The average speed for most roads in the Planning Area is generally less than 35 mph. .

In general, little vegetation grows within the roadway. Since all transportation is limited to designated roads and trails, few if any direct impacts to special status plants would be expected. Minor, short-term indirect impacts could result from dust from traffic on the designated transportation system. Increased access into areas could lead to an increase in foot traffic or unauthorized off-road vehicle use in special status plant habitat.

Desert Tortoise (Parashant and Arizona Strip FO): The Desert Tortoise Recovery Plan (USFWS 1994) found that paved highways and unpaved and paved roads, trails, and tracks have profound impacts on desert tortoise populations and habitat. The USGS (2002) reviewed threats to desert tortoise and indicated that mortality is an important factor for tortoise populations along highways, affecting populations up to two miles or more away (von Seckendorff Hoff and Marlow 1997). However, mortality is a very low or non-existent threat for populations away from highways. The effects of roads on wildlife vary with road surface, traffic speed and volume, and density of the species. Most studies of the effects of routes on desert tortoise were conducted in areas of high density tortoise habitat (Boarman and Sazaki 1996; Boarman et al. 1997; von Seckendorff Hoff and Marlow 1997). Of these, only von Seckendorff Hoff and Marlow (1997) address dirt roads.

Desert tortoise habitat on the Arizona Strip is characterized by single-width dirt roads with maximum safe travel speeds of 35 mph. Public use of most of these routes involves fewer than 10 vehicles per day, with most use occurring during the inactive season. Desert tortoise densities are lower in Parashant and the Arizona Strip FO than anywhere else in the range of the species.

At least 62 percent of desert tortoise habitat within the Planning Area is within 0.5 miles of a route (Thompson, et. al 2004). All roads in Parashant and most roads in the Arizona Strip FO are unpaved and narrow with little to no crown. Drainage bars that drain perpendicular to the roadway are used rather than parallel ditches that might trap a tortoise. However, in the Arizona Strip FO, Interstate 15 acts as a permanent physical barrier to movement that isolates the Beaver Dam Slope and the Virgin Slope tortoise populations. County Route 91 southwest of Littlefield, Arizona, also fragments these two populations. North of Littlefield, vehicle traffic on Route 91 is a source of tortoise mortality, though the populations on either side of the route are still somewhat connected.

Systematic surveys for tortoise carcasses along roadways through the habitat have not been conducted. However, anecdotal evidence indicates that the incidence of collisions is very low, probably due to the low traffic volume and speeds of vehicles. The majority of collisions has occurred, and would likely continue to occur, along County Road 91. Installation of tortoise barrier fencing would significantly reduce the number of collisions. The remaining unpaved roads in the Beaver Dam and Virgin Slope ACECs have low to moderate impacts on desert tortoise as a result of the combination of traffic volume, speed, and tortoise density in these areas. Speed limits apply to vehicles associated with authorized actions in the Pakoon WHA. Due to the limited travel speeds, low traffic volume, and low tortoise densities, collisions in the WHA are considered to be extremely infrequent. As a result, impacts on desert tortoise from routes in the Pakoon WHA are considered negligible to minor.

Desert tortoise may be injured or killed as a result of collisions with vehicles traveling on the existing transportation system. In addition to providing many opportunities for accidental mortality, roads also act as a barrier to tortoise dispersal, fragment habitats (USFWS 1994; Boarman 2002), and provide access to remote areas. Impacts to desert tortoise dispersal and the degree of habitat fragmentation are difficult to assess, but are anticipated to be negligible to minor in the two planning areas.

Routes also facilitate increased human access to the habitat and provide a potential conduit for invasive plant species, increase opportunities for unlawful collection of tortoise, increase intentional or unintentional injury of animals from human handling, reduce forage where soils are compacted, and increase predation. Invasive exotic species, such as red brome and cheatgrass, are already common throughout the Mojave Desert. The role of current routes in the spread of these exotics is difficult to assess. Recreational use of desert tortoise habitat in the Planning Areas is limited to the tortoise inactive season and the spring months. After mid-May, these areas are generally too hot for most visitors. Camping and other recreational uses are rare, particularly in the warm summer months. Within the Monument and the desert tortoise ACECs, pulling off the road to camp is not allowed. Use of OHVs in the habitat is very limited except in the area surrounding Mesquite and Littlefield.

Little or no information is available regarding the levels of illegal handling and collection of desert tortoise. Tortoise collection was likely a much greater issue prior to the listing of the species. Current information from law enforcement personnel indicates no contacts have been made involving incidents of collection. Unlawful handling probably occurs on an infrequent basis, particularly along County Road 91. Use of vehicles off designated routes continues to be prohibited. Ravens and coyotes are common in desert tortoise habitat in the two planning areas. However, there is little or no information about the level of raven predation on desert tortoise in these areas, either on or away from routes.

No new permanent roads or trails would be constructed, and maintenance would continue at current standards. The construction of new, temporary roads to facilitate project implementation

would result in moderate, short-term direct impacts to desert tortoise, as some individuals would be injured, killed, or displaced during construction and rehabilitation work.

Negligible to moderate, short-term direct impacts could occur to desert tortoise from maintenance activities, including localized loss of habitat, disturbance, injury, or death of individual animals. Road maintenance improves conditions for vehicle travel, facilitating vehicular use and higher speeds. Such conditions may lead to increased injury or mortality of tortoises on roads. Tortoises could also be crushed on roads by a road grader. Maintenance often involves grading into washes to improve drainage off the road. Tortoises could be injured in drainages, and burrows constructed in the banks of washes could be damaged or destroyed. Tortoises could be trapped in collapsed burrows following road maintenance. Under this alternative, the potential for injury to or mortality of tortoises during maintenance activities would be limited by restricting non-emergency maintenance to the tortoise inactive season (October 15 to March 15).

Rehabilitation of closed roads or temporary roads where use is no longer required would have moderate, short- and long-term direct and indirect impacts depending upon the habitat and the closure method. Short-term direct impacts would include construction noise and dust and disturbance from human activity. Other direct impacts include displacement, loss of habitat, injury, or death of individuals during the rehabilitation phase. Indirect impacts include increased access into previously unused areas of tortoise habitat.

Following completion of rehabilitation actions, effects to desert tortoise would be similar to those described above for new temporary roads, depending upon the methods used. In addition, long-term benefits to desert tortoise would result from closing and rehabilitating roads through their habitat by eliminating or reversing many of the adverse effects described above.

Brady Pincushion Cactus, Holmgren Milk-vetch, Jones' Cycladenia, and Siler Pincushion Cactus (Arizona Strip FO only): Impacts to these listed plant species from implementation of the travel management system include reduced fitness as a result of dust, physical disturbance, and injury or mortality where vehicles drive over plants. Of these species, only Jones' cycladenia populations are located far enough from existing roads as to be at low risk from vehicles. Both Brady and Siler pincushion cactus populations are sufficiently close to roads as to be at risk from vehicles turning around or pulling off the road to camp. Holmgren milk-vetch and Siler pincushion cactus populations are located within areas commonly used by OHVs, though these areas are not open to off-road vehicle use. Impacts to these species are greatest following wet weather.

Impacts from Vegetation and Fire and Fuels Management

Vegetation and Fire and Fuels Management could affect special status species as described below. The scope and intensity these impacts, particularly long-term changes to habitat quality, would be minimized by implementation of conservation measures (Appendix 2.E).

Restoration and Vegetation Treatments: During restoration treatments, effects to special status species and their habitat could include disturbance of breeding, feeding, and sheltering activities; temporary or permanent loss of habitat or components; increased habitat fragmentation; increased susceptibility to predation; forced emigration; and/or direct injury or mortality. Reclamation of sites previously disturbed by facility development would have minor short- and long-term direct and indirect impacts. Short-term minor direct impacts would include reestablishment of native vegetation. Long-term minor direct impacts would include reestablishment of vegetation structure. Short-term minor indirect impacts would include reduced erosion and compaction, and increased infiltration. Long-term minor indirect impacts could include increased vegetation productivity.

Reclamation actions such as re-contouring, ripping compacted areas, replacing topsoil, seeding, and planting could injure or kill individuals. The magnitude of anticipated impacts would vary by the treatment method used, but would generally vary from minor to moderate, particularly for plants or animals with low mobility.

Following vegetation treatment, increased invasion of noxious weeds and other exotic weed species, decreased water availability, and long-term changes in habitat and species composition could occur. The duration of these effects would vary by treatment method, habitat, and community type; availability of appropriate seed; and amount and timing of precipitation. Temporary or permanent reductions in water quantity, quality, or access could lead to the same anticipated effects. Vegetation treatments in riparian areas that result in successful reduction of tamarisk and other invasive exotics would ultimately benefit most riparian dependent species, though treatments would initially have adverse effects.

Mechanical and chemical treatment methods could result in localized, short-term impacts to air quality, including fugitive dust, emission/exhaust from equipment, and chemical fumes. Temporary reduction in air quality could lead to reduced fitness, increased susceptibility to predation, or mortality among wildlife species.

Vegetation Products Use/Sale: Use and/or sale of vegetation products would not be authorized in Vermilion. Harvest of vegetative materials such as native seed, pinyon nuts, posts, and fuel wood would not be authorized in Parashant and the Arizona Strip FO unless associated with a research or restoration project. This would effectively limit such uses to a limited area under close monitoring. Post cutting, collection of dead and downed wood for campfires, Christmas tree harvest, and collection of pinyon nuts would have negligible to moderate direct and indirect effects on some special status species. Direct impacts include disturbance of individuals at breeding, feeding, or sheltering sites; loss of cover or similar habitat features; injury or death; increased risk of fire; increased risk of predation; and nest abandonment. Indirect impacts to species would include loss of forage or cover species, increased soil surface temperatures, and short or long-term changes in species composition and/or community structure. Impacts resulting from fuelwood harvest associated with restoration projects could lead to nest

abandonment among special status bird species. Salvage of vegetation that would be destroyed through surface disturbing activities would not be authorized in the Planning Area under this alternative.

Noxious Weeds: Management of noxious weeds may cause temporary negligible to moderate impacts to non-target plant species depending upon the method used (see Impacts to Vegetation section). Assuming proper application of approved herbicides, noxious weed management would be expected to have minor to moderate impacts to special status plants and negligible to minor effects on special status animals. Treatments designed to decrease or eliminate noxious weeds would benefit native vegetative communities in the long term by reducing or eliminating competition with noxious weeds, increasing forage and cover values, and restoring native vegetative communities.

Fire Suppression, Use, and Management: Effects of fire on special status species depend upon the severity of the fire and the methods and intensity of suppression efforts. Direct impacts of wildfire, prescribed fire, and fire suppression activities include injury or death of individuals or local populations; disturbance/displacement from breeding, feeding, and/or sheltering activities; and increased risk of predation. Wildfires may leave the surrounding soil and accumulated ash vulnerable to erosion and remove shading streamside vegetation, which would increase sedimentation and water temperature. Indirect impacts could include reduction in plant vigor or animal health, alteration or loss of plant communities, loss of seed-dispersal mechanisms, increased light penetration and temperatures, and loss of cover. Chemical retardants in the water may have adverse effects on vegetation and/or wildlife that forage upon them. Direct and indirect impacts from most suppression techniques would be short-term, temporary, and localized, particularly if sensitive habitats are mitigated or avoided. The timing of prescribed fire could minimize impacts. Refer to Impacts to Fish and Wildlife from Vegetation and Fire and Fuels Management for a more detailed discussion.

All Special Status Species: Impacts from implementation of restoration and vegetation treatments would vary by the method used to accomplish the treatment. Where fuel loads are excessive, failure to conduct vegetation treatments increase the risk of catastrophic fire and lead to loss of individuals or habitat.

Desert Tortoise (Parashant and Arizona Strip FO only): Authorization of vegetation treatment projects in desert tortoise habitat is unlikely. However, should such treatments occur, adverse effects would likely result to desert tortoise. Vegetation treatment projects would not be authorized in desert tortoise habitat during the active season (March 15 to October 15). Use of non-native seeds could lead to negligible to moderate adverse effects by replacing native species, rendering habitat unusable, and/or increasing fire frequency.

The Pakoon DWMA/ACEC in Parashant and the desert tortoise ACECs in the Arizona Strip FO would be closed to the collection of vegetative products. Use and/or sale of vegetation products

outside the DWMA/ACEC would have localized, negligible to minor impacts on desert tortoise. Few, if any, woodland products are available in desert tortoise habitat.

Noxious weed treatments in desert tortoise habitat may include chemical treatments. Effects of these actions on desert tortoise are expected to be negligible to minor. Desert tortoise should benefit from reduction or elimination of noxious weeds.

Desert tortoise habitat in the Mojave Desert has been severely altered from a variety of causes, leaving these non-fire-adapted habitats at risk from severe wildfires. The BLM and NPS would continue to monitor research on biological and chemical control that may be useful in the future to reduce exotic vegetation and restore habitat. The BLM and NPS would not use chemical or biological treatments in occupied or critical habitat for tortoises, as these tactics would not be effective in thinning or removing accumulations of fuel loads or in restoring habitat conditions in this vegetation type. Similarly, because this habitat has a low tolerance to fire or mechanical treatments, the BLM and NPS would not implement wildland fire use, prescribed burning, or mechanical treatments in habitats occupied by tortoises or designated as critical habitat.

Fire suppression operations in habitat supporting desert tortoise could protect critical habitat from long-term effects from fire. However, fire suppression operations could also adversely affect tortoises and lead to modifications of critical habitat. Direct impacts would occur from setting backfires, fireline construction, retardant drops, construction and use of staging areas within the habitat, and use of vehicles associated with suppression activities. Establishment of campsites and aircraft landing/fuel sites could result in death or injury of tortoises. Indirect impacts to desert tortoise from wildfire suppression could include reduction in quantity and/or quality of forage, soil disturbance or compaction, removal of vegetative cover for thermal protection and predator avoidance, and human disturbance. Creation of new routes used in fire suppression may facilitate OHV use and associated habitat damage, as well as the crushing of tortoises by vehicles or collection of animals as pets. Refuse left by fire crews could attract desert tortoise predator, such as ravens and coyotes. Effects to tortoises and their habitat from human disturbance associated with fire suppression activities would be short-term, ending when the suppression actions are complete.

Mexican Spotted Owl: Although the BLM believes that Mexican Spotted Owls do not currently breed within the Planning Area, owls may occasionally use the area for roosting, wintering, and dispersal. In the unlikely event that an undetected owl was present during vegetation management activities, effects to the species would be similar to those described for vegetation treatments above.

Use and/or sale of vegetation products in Parashant and the Arizona Strip FO would have localized, negligible to minor impacts on Mexican Spotted Owl. Preferred nesting habitat for the species is cool, shady, steep-walled canyons. Such areas are generally too steep and have too few trees to be suitable for woodland products harvest.

Impacts from implementation of noxious weed management actions would be similar to those described for vegetation treatments above. Effects of these actions on Mexican Spotted Owls are expected to be negligible. Owls should benefit from reduction or elimination of noxious weeds in their habitat.

In the unlikely event that an undetected owl was present during prescribed fire or fire suppression activities, adverse effects could occur depending upon the proximity to the animal. Low-flying aircraft, helispots, spike camps, or handline construction could disturb an undetected owl if the facilities or activities were located close to an unknown roosting site. In addition to habitat alteration, other impacts such as mortality, injury, disturbance, or displacement of owls could result from these activities. Undetected owls could also be disturbed by smoke, noise, and other human activity associated with fire management activities. Depending on the proximity to the fire, the bird should be able to relocate to an adjacent habitat area to escape disturbance.

Because of their great mobility, the lack of suitable roosting sites, lack of any previous observations, and lack of concentrated food sources, the potential for effects from vegetation management actions, including Fire Suppression, is considered negligible.

Bald Eagle: Although Bald Eagles do not currently breed within the Planning Area, they may occasionally use the area for foraging and roosting during the winter. In the unlikely event that a Bald Eagle was present during vegetation management activities, effects to the species would be similar to those described for vegetation treatments above.

Use and/or sale of vegetation products in Parashant and the Arizona Strip FO would have localized, negligible impacts to Bald Eagles. Preferred roosting habitat for Eagles would be open areas with elevated perches. Forest habitats where the woodland products harvest would occur would generally be too dense for Bald Eagle roosts or perches. In addition, there are no large water sources or other areas of concentrated prey availability within the Planning Area.

Impacts from implementation of noxious weed management actions would be similar to those described for vegetation treatments above.

In the unlikely event that an undetected Bald Eagle was present during prescribed fire or fire suppression activities, adverse effects would occur depending upon the proximity. Anticipated impacts would be similar to those described above for Mexican Spotted Owls.

Because of their great mobility, the lack of suitable roosting sites, lack of any previous observations, and lack of concentrated food sources, the potential for effects from vegetation management actions, including fire suppression, is considered negligible.

California Condor: Condors may experience direct impacts from mechanical or chemical fuel treatments in their nesting, roosting, or foraging territories. However, because of the specific, targeted nature of these methods, the gradual changes to vegetation, and the ability to avoid

Condors during application of the treatment, the potential for adverse effect is considered very low. Even large-scale operations such as chainings or pushes in pinyon-juniper habitat or restoration thinning in ponderosa pine should have little effect on Condors due to their very low level of anticipated use in these habitats.

Use and/or sale of vegetation products in Parashant and the Arizona Strip FO would have localized, negligible impacts to Condors. Preferred roosting habitat for Condors would be open areas with elevated perches. Woodcutting, Christmas tree harvest and other actions that lead to loss of trees or snags could lead to direct impacts if roost trees are removed. However, forest habitats where the woodland products harvest would occur would generally be too dense for California Condor roosts or perches.

Impacts from implementation of noxious weed management actions would be similar to those described for vegetation treatments above. Effects of these actions on California Condor are expected to be negligible.

In the unlikely event that a California Condor was present during prescribed fire or fire suppression activities, adverse effects would occur depending upon the proximity. Low-flying aircraft, helispots, spike camps, or hand-line construction could disturb Condors if the facilities or activities were located close to a roost or nesting site. In addition to habitat alteration, other impacts such as mortality, injury, disturbance, or displacement of Condors could result from these activities.

Condors could also be disturbed by smoke, noise, and other human activity associated with these fire management activities. Because Condors find their food visually, smoke could interfere with the ability of foraging birds to locate carcasses. Smoke could also make it harder for flying Condors to see obstacles such as aircraft or electrical transmission lines and increase the risk of a collision. Smoke may also disturb breeding or foraging activities of Condors. Condors may experience reduced foraging or breeding fitness due to inhalation of smoke and ash.

Other indirect impacts to California Condors may include long-term changes in their food supply, loss or changes to foraging habitat, and loss of roosting habitat in woodland habitats resulting from wildland or prescribed fire. However, because Condors find their food visually and because wildland and prescribed fires would open up a closed canopy woodland and make hidden carcasses more visible, the burning of thickly vegetated habitats would be beneficial to Condors.

Because Condors are a mobile species, the potential for direct impacts from fire suppression and use activities is low. In addition, conservation measures (Appendix 2.E) would be implemented, including pre-season and pre-mission briefings for fire suppression crews, pilots, and helitack crews; minimum altitudes and flight distances in known Condor areas; mandatory resource advisor on fires in Condor areas; making daily contact with Peregrine Fund personnel to determine location of

Condors; covering dip tanks to minimize collisions; and minimizing attractants such as trash. Helispots would generally be constructed away from areas used by Condors.

Implementation of vegetation management decisions would lead to mostly negligible to minor effects to Condors. However, because Condors are known to nest within Vermilion and may at some point nest within Parashant and the Arizona Strip FO, disturbance at a nest site is a possibility.

Southwestern Willow Flycatcher and Yuma Clapper Rail (Arizona Strip FO only): Special status bird species dependent upon riparian vegetation may be affected by implementation of vegetation treatments, collection of fuelwood for campfires, and fire use and/or suppression actions within the riparian corridor.

Effects to Southwestern Willow Flycatcher and Yuma Clapper Rail from implementation of vegetation treatments or restoration projects would vary by the method of treatment used. As with desert tortoise, vegetation treatment projects would generally not be proposed in habitat of these listed species except where doing so would enhance survival and recovery of these species. Direct impacts could include disturbance, injury, or mortality from personnel or vehicles in or adjacent to nesting habitat; nest abandonment; and loss of habitat. Indirect impacts would include reduced fitness or mortality resulting from loss of vegetative cover, increased temperatures at nesting sites from loss of shading, reduction or loss of available nest sites, reduction or loss of food resources, and increased risk of predation and/or nest parasitism. Effects would vary from short to long term.

Under this Alternative, the sale of vegetation products in the Virgin River Corridor ACEC would not be authorized. However, there is no prohibition against such actions within the riparian zone at Kanab Creek. In addition, impacts could result from collection of firewood for personal use. Direct, negligible to minor impacts could result if nests are disturbed during collection of wood. This is not considered a likely occurrence. Generally, little if any fuelwood is available in habitat areas for these species. However, collection of firewood in riparian areas could reasonably be expected for building a campfire. Campfires increase the probability of fire escaping and burning through the habitat area.

Effects from fire use and suppression include direct impacts such as disturbance, injury, or mortality from use of vehicles associated with fire suppression, impacts to eggs or nest structures from foam retardants or water drops, nest abandonment, mortality from construction of fire line through habitat, and loss of individuals from the fire itself. Indirect impacts include reduced fitness resulting from the actions described above.

Woundfin Minnow and Virgin River Chub (Arizona Strip FO only): Native Virgin River fishes may be affected by implementation of vegetation treatments and fire use and/or suppression actions within the riparian corridor.

Effects to Virgin River fishes from implementation of vegetation treatments or restoration projects would vary by the method of treatment used. As with desert tortoise, vegetation treatment projects would generally not be proposed in listed fish habitats except where doing so would enhance survival and recovery of these species. Direct impacts could include disturbance, injury, or mortality from use of vehicles associated with vegetation treatments, toxicity from chemical treatments or spills, or physical removal of habitat. Indirect impacts would include reduced fitness or mortality resulting from loss of vegetative cover, increased temperature from loss of shading, increased sedimentation from erosion in surrounding watersheds, reduction or loss of hiding cover, reduction or loss of food resources, and the potential for increased predation. Impacts would vary from short to long term.

Fish are affected by fire and fire suppression in a variety of ways. Direct impacts include disturbance, injury, or mortality from use of vehicles associated with fire suppression; toxicity from chemical spills or use of foam retardants; and the potential for fish to be sucked into water pumps or similar equipment. Indirect impacts would be similar to those described above for vegetation treatments, plus the introduction of ash, which could clog fish gills and pollute breeding or feeding habitats.

Brady Pincushion Cactus, Holmgren Milk-vetch, Jones' Cycladenia, and Siler Pincushion Cactus (Arizona Strip FO only): Impacts to these listed plant species from implementation of vegetation management decisions are considered negligible. No vegetation treatments would be undertaken in areas where these species occur. Few if any vegetative products would be available in these areas for sale. Fuels in the habitat of these species are sufficiently light that the probability of fire is extremely low.

Impacts from Soil, Water and Air Resources

Generally, watershed restoration projects would not be proposed within special status species habitats unless the project was considered essential for providing long-term benefits to one or more special status species. However, Alternative A does not include prohibitions on such actions in special status species habitats.

Impacts associated with vegetation treatments and restoration projects would be similar to those described in the Impacts to Vegetation from Vegetation and Fire and Fuels Management section above.

Construction of dams, dikes, and other water retention structures would have short-term impacts on vegetation resources similar to those described for vegetation treatments. The area of disturbance would vary by the action proposed, but generally would average less than five acres per structure.

Desert Tortoise (Parashant and Arizona Strip FO only): No watershed restoration or other treatment projects are specifically proposed within desert tortoise habitat under this alternative,

though such projects could be authorized where the project benefits or improves tortoise management. Most methods for treating Mojave Desert habitats would have little or no positive effects on such habitats and would likely increase the spread of invasive exotics such as cheatgrass. As a result, it is unlikely that any such projects would be proposed over the life of this Plan. Reclamation would be required for any such project authorized within the Pakoon DWMA/ACEC that would result in the loss or degradation of tortoise habitat. The habitat would then be restored or reclaimed as close to pre-disturbance conditions as practicable and would include planting or seeding of only native vegetation.

Minor to moderate direct impacts to desert tortoise could result from watershed restoration or vegetation treatment projects where individual tortoise or eggs are injured or killed by being crushed by the equipment used. Vehicles associated with surface disturbing actions have the potential to run over tortoise or their burrows. Ground disturbance would also encourage use of the area by predators, as would any trash or debris left on site from construction activities. Depending upon the methods for treatment, seeding, and/or reclamation and the availability of post-treatment precipitation, indirect adverse effects would occur from loss of tortoise forage plants, shelter sites and other forms of thermal cover, and an increase in ambient temperatures. Long-term changes in vegetation could adversely affect tortoise where treatment objectives are not met and/or where invasive exotics out-compete native plant species. Some individual tortoises may be displaced from the treatment site due to loss of necessary habitat components.

Mexican Spotted Owl: Watershed restoration treatment projects are proposed in the vicinity of Mt. Trumbull, including the Death Valley and Lang's Run areas. Habitats in these areas are primarily composed of ponderosa pine and pinyon-juniper communities. Mexican Spotted Owls in the Colorado Plateau region have shown a preference for cool, shady canyons and mixed conifer habitats for nesting. There are no mixed conifer stands within the Planning Area. Surveys for Mexican Spotted Owls have been conducted in proposed treatment areas and no suitable nesting habitat for the species was identified. Therefore, vegetation treatment projects would not occur in suitable nesting habitat for Mexican Spotted Owls. However, while nesting habitat for this species is rare or non-existent, wintering habitat is abundant. There is potential for the species to be found virtually anywhere in the Planning Area during the winter.

In the unlikely event that an undetected owl was present (roosting, foraging, dispersing, or wintering) during vegetation management activities, adverse effects would occur from disturbance by the noise and dust associated with treatment. Depending upon the proximity, the owl could be temporarily or permanently flushed from the site. Owls could also be disturbed by use of aircraft, potentially leading to collisions and mortality of individual owls.

Bald Eagle: Bald Eagles do not nest within the Planning Area but may range widely over the area during the winter months. Observations of Bald Eagles on the Planning Area are extremely rare. No Bald Eagle sightings have been recorded within 10 miles of the watershed restoration treatment projects proposed for the Death Valley and Lang's Run areas in Parashant. No watershed restoration or other treatment projects are specifically proposed within potential Bald

Eagle habitat under this alternative in the Arizona Strip FO, though such projects could be authorized where the project benefits or improves management of the species.

Adverse effects could occur where Eagles would be disturbed from roosting or foraging by the noise and dust associated with surface disturbing actions. Where aircraft are used in conjunction with the project, such as with aerial seedings, there is potential for Eagles to collide with aircraft or be disturbed from roosting or foraging. Collisions would likely lead to mortality of the individual.

Because of their great mobility, the infrequency of observations, and lack of concentrated food sources with suitable roosting sites nearby, the potential for effects to Bald Eagles from watershed restoration and treatment actions is considered negligible.

California Condor: Based on radio-telemetry data, California Condors probably range widely across the Planning Area, and may be observed throughout the year. Condors have been known to exhibit "curiosity" for human activities, and may be attracted to areas of disturbance. Condors have not been observed within 10 miles of the area of the proposed watershed restoration treatment projects in the Death Valley and Lang's Run areas. The habitat in these areas is primarily composed of ponderosa pine and pinyon-juniper communities. Condors roost on ledges along cliff faces and generally forage in open habitats. The proposed treatment areas have been surveyed and do not include any suitable nesting habitat and little foraging habitat for this species.

In the unlikely event that a Condor entered the area of active watershed restoration activities, adverse effects could occur. Condors would be disturbed from roosting or foraging by the noise and dust associated with surface disturbing actions. Garbage and debris left at the site could be ingested by the birds, leading to reduced fitness, illness, or death. Condors could also be disturbed by use of aircraft, potentially leading to collisions and mortality of individual Condors.

In Parashant, because of their great mobility, the infrequency of observations, and paucity of suitable foraging areas or roosting sites, the potential for effects from watershed restoration and treatment actions is considered negligible.

In Vermilion, because of their great mobility, the frequency of observations, and presence of suitable foraging areas or roosting sites, the potential for effects from watershed restoration and treatment actions is considered moderate.

In Arizona Strip FO, implementation of Air, Water, and Soil resource decisions would lead to mostly negligible to minor effects to Condors. However, because Condors may at some point nest within the Arizona Strip FO, disturbance at a nest site is a small, but not discountable, possibility.

Southwestern Willow Flycatcher and Yuma Clapper Rail (Arizona Strip FO only): While no specific watershed restoration or other treatment projects are specifically proposed within riparian habitat for these species, such projects could be authorized where the project benefits or improves management of the species. Such projects could include restoration of tamarisk dominated sites to cottonwood-willow gallery forests or other riparian communities.

Woundfin Minnow and Virgin River Chub (Arizona Strip FO only): While no specific watershed restoration or other treatment projects are specifically proposed within habitat for these species, such projects could be authorized where the project benefits or improves management of the species.

Brady Pincushion Cactus, Holmgren Milk-vetch, Jones' Cycladenia, and Siler Pincushion Cactus (Arizona Strip FO only): No watershed restoration or other treatment projects are specifically proposed within special status plant habitats under this alternative, though such projects could be authorized where the project benefits or improves management of the species.

Impacts from Fish and Wildlife

All Special Status Species: Impacts to special status species may result from initial or supplemental transplants of big game species, restoration and other vegetation treatment projects, construction and maintenance of artificial water sources, and use of aircraft in wildlife management activities.

Desert Tortoise (Parashant and Arizona Strip FO): No big game transplants are planned within desert tortoise habitat. Supplemental releases of desert bighorn sheep could occur in the future, but these would be located at higher elevations above where tortoise would normally occur. Indirect impacts could result if vehicles used to transport big game animals for release introduce noxious weeds, thereby reducing habitat quality. Under this alternative, washing vehicles brought in from other areas is not a mandatory requirement.

There are no wildlife water developments within desert tortoise habitat in the Monument and no new artificial water sources are proposed.

Mexican Spotted Owl: Construction and maintenance of wildlife water development projects may result in negligible effects to Mexican Spotted Owl from use of aircraft. Construction activities at more remote sites occasionally require use of a helicopter to ferry supplies, materials, and/or work crews to the site. In addition, AGFD conducts annual or biennial aerial surveys to count pronghorn antelope and bighorn sheep. Most surveys are conducted from fixed-wing aircraft, though helicopters are occasionally used. With implementation of conservation measures and the ability of special status raptors to avoid aircraft, the potential for collisions is still considered very low.

Bald Eagle: Initial and supplemental transplants of big game wildlife species may result in negligible long-term benefits to Bald Eagles and California Condor by providing additional potential food sources. Indirect impacts could result if vehicles used to transport big game animals for release introduce noxious weeds, thereby reducing habitat quality. Under this alternative, washing vehicles brought in from other areas is not a mandatory requirement.

Construction of wildlife water development projects may result in negligible to minor effects to Bald Eagle and California Condor. Increased use of the area by wildlife species not previously present would lead to increased prey availability for predators and scavengers. This could result in beneficial effects for Bald Eagles and Condors. As many as 20 new wildlife water developments would be built throughout the life of this Plan.

California Condor: Impacts to Condors from implementation of wildlife transplants and construction and maintenance of wildlife water developments are discussed above with Bald Eagles. In addition, construction projects may leave environmental contaminants, waste products, trash, or other debris that could be ingested by California Condors. In addition to the conservation measures (Appendix 2.E) for California Condor, all construction projects must comply with project stipulations that address cleanup of these materials. Stipulations include covering open waste ponds with netting or otherwise making them inaccessible to wildlife. Because of the site-specific nature of these types of actions and the ability that Condors have to move away from or otherwise avoid project activities, the potential for adverse effect is considered very low.

Southwestern Willow Flycatcher and Yuma Clapper Rail (Arizona Strip FO only): No wildlife transplants are specifically proposed within riparian habitat for these species, though such projects could be authorized. In particular, habitat areas for Southwestern Willow Flycatcher have been identified in the Virgin River Gorge, within the Beaver Dam Mountains desert bighorn sheep habitat area. Supplemental transplants of sheep to this area could occur in the future. In addition, bighorn could be captured in this area for release in other locations. Any such transplants would be conducted outside of the breeding season of Southwestern Willow Flycatchers and Yuma Clapper Rail, which would minimize any potential impacts.

Woundfin Minnow and Virgin River Chub (Arizona Strip FO only): As with Southwestern Willow Flycatcher or Yuma Clapper Rail, captures and supplemental releases of desert bighorn sheep could be authorized within the Virgin River Gorge at some time in the future. Because desert bighorn walk in the river, there is a small possibility that sheep could step on eggs or young of native fish, leading to injury or mortality. However, the likelihood of this occurrence is considered so low as to be discountable.

Brady Pincushion Cactus, Holmgren Milk-vetch, Jones' Cycladenia, and Siler Pincushion Cactus (Arizona Strip FO only): Supplemental releases of desert bighorn sheep could occur within the habitat of Brady pincushion cactus. Similarly, releases of pronghorn antelope could occur in the habitat of Siler pincushion cactus. There is a small possibility that these animals

could step on and injure or kill listed plant species in these areas. However, the likelihood of this occurrence is considered so low as to be discountable.

Impacts from Special Status Species

Desert Tortoise (Parashant and Arizona Strip FO): In Parashant, designation of the Pakoon ACEC provides enhanced management capabilities for desert tortoise by minimizing effects from other resource management programs. Impacts from implementation of restrictions on authorized uses within listed species habitats are described under the resource program where the restrictions apply.

In the Arizona Strip FO, designation of the Beaver Dam Slope, Virgin Slope, and Virgin River Corridor ACECs provides enhanced management capabilities for desert tortoise by minimizing impacts from other resource management programs. Impacts from implementation of restrictions on authorized uses within listed species habitats are described under the resource program where the restrictions apply.

Southwestern Willow Flycatcher and Yuma Clapper Rail (Arizona Strip FO only): Designation of the Virgin River Corridor ACEC provides enhanced management capabilities for these species by minimizing impacts from other resource management programs. Impacts from implementation of restrictions on authorized uses within listed species habitats are described under the resource program where the restrictions apply.

Woundfin Minnow and Virgin River Chub (Arizona Strip FO only): Designation of the Virgin River Corridor ACEC provides enhanced management capabilities for these species by minimizing impacts from other resource management programs. Impacts from implementation of restrictions on authorized uses within listed species habitats are described under the resource program where the restrictions apply. In addition, Alternative A includes a decision to evaluate and protect instream flows for Virgin River fishes. These actions have beneficial effects to Virgin River fishes by protecting existing flows.

Brady Pincushion Cactus and Siler Pincushion Cactus (Arizona Strip FO only): Designation of the Marble Canyon ACEC provides enhanced management capabilities for Brady pincushion cactus by minimizing impacts from other resource management programs. Similarly, the Johnson Spring, Lost Spring Mountain, Moonshine Ridge, and Fort Pearce ACECs provide enhanced management and protection for Siler pincushion cactus. Impacts from implementation of restrictions on authorized uses within listed species habitats are described under the resource program where the restrictions apply.

Impacts from Minerals (Arizona Strip FO only)

In the Arizona Strip FO, impacts to special status species from minerals management actions could result from locatable mineral development, oil and gas development, and/or mineral

material sales/disposal. Impacts associated with these actions would include disturbance, injury, or mortality of individuals, particularly species with little or no mobility. Vehicles associated with mineral development activities could strike or run over listed species, or their breeding, feeding, or sheltering sites. Habitat could be degraded or otherwise modified, resulting in reduced fitness for the species. Chemicals used in mineral extraction may pose a hazard to listed species in the area. Such operations may also increase trash and debris at the site, encouraging predators of listed species.

Desert Tortoise (Arizona Strip FO only): Under Alternative A, desert tortoise ACECs would be available for fluid mineral leasing from October 15 to March 15, subject to a waivable no surface occupancy stipulation. Leasing of minerals is unlikely to occur in the ACECs as no economic occurrences of oil and gas resources have been found. However, the Arizona Strip has been only lightly explored for these resources. Potential for development of any geothermal resources in the area are low. Restricting surface-disturbing activities to the inactive season for tortoises would reduce the probability of some forms of take, such as tortoises being struck by vehicles on roads, but animals could still be killed or injured in their burrows and habitat could still be disturbed by mineral extraction.

Salable minerals, in the form of sand and gravel are abundant along the lower Virgin and Beaver Dam slopes. Most of the Virgin and Beaver Dam Slopes and areas along Beaver Dam Wash are recognized as having high potential for sand and gravel. While desert tortoise ACECs would be closed to mineral material sales, such actions could still be authorized in desert tortoise habitat outside of the ACECs. Direct impacts include disturbance, injury or mortality where tortoise are run over or crushed in their burrows, loss of habitat, increased risk of ingestion of foreign objects and toxic substances, and an increase in tortoise predators.

No locatable mineral mines are present in the ACECs and only one exploration site is known on the Beaver Dam Slope. However, the Beaver Dam Mountains outside the ACECs have moderate potential for placer gold and moderate to high potential for disseminated gold and breccia pipe minerals. The BLM requires a plan of operations, mitigation, reclamation, and bonding for these types of mineral developments. While mining activity has been very low in the past, there is reason to suspect increased demand for these resources in the future.

California Condor (Arizona Strip FO only): Because of their tendency toward apparent curiosity, Condors may be attracted to mineral extraction sites and may ingest debris or toxic substances that could lead to adverse effects to the species. Negligible effects could occur to these species in the form of noise, dust, and disturbance resulting from the equipment used for construction and maintenance of projects. These effects would be short term. Trash, debris, and waste materials left on site could be consumed by these birds, though project stipulations require that such trash be gathered and removed from the site.

Southwestern Willow Flycatcher and Yuma Clapper Rail (Arizona Strip FO only): As noted above for desert tortoise, the sale of sand and gravel materials within the Virgin River Corridor ACEC would not be authorized. In addition, habitat for these riparian bird species

within the Virgin River Gorge is also included within the Beaver Dam Mountains Wilderness, further limiting mineral exploration activities. However, oil and gas leasing and locatable mineral extraction could still occur outside of the Gorge within the Virgin River Corridor ACEC, as well as in the Kanab Creek ACEC. Impacts would be similar to those described above for all special status species. Restricting surface-disturbing activities to the non-breeding season for Southwestern Willow Flycatchers would eliminate disturbance effects from noise and dust. Direct impacts from loss of habitat would be limited or eliminated as a result of floodplain restrictions and consultation with the USFWS under ESA.

Woundfin Minnow and Virgin River Chub (Arizona Strip FO only): Effects to Virgin River fishes from implementation of minerals management actions would be similar in scope and extent to those described above for riparian birds.

Brady Pincushion Cactus, Holmgren Milk-vetch, Jones' Cycladenia, and Siler Pincushion Cactus (Arizona Strip FO only): Implementation of minerals management actions in special status plant habitats could lead to similar effects to those described above for other listed species. The Marble Canyon and Fort Pearce ACECs do not include prohibitions on sales of mineral materials as does the desert tortoise ACECs.

Impacts from Livestock Grazing

Effects to Special Status Species: Impacts to special status species could result from livestock stepping on special status animals or plants. Trampling is generally considered a negligible effect for sensitive animal species because of the mobility of the animals, though desert tortoises are an exception. Effects of trampling are minor to moderate for sensitive plant species. Livestock herbivory of sensitive plant species would result in minor to moderate effects, though none of the sensitive plants within the Planning Area are considered suitable livestock forage.

Desert Tortoise (Parashant and Arizona Strip FO): Grazing by livestock (cattle and sheep) may have direct and indirect effects on tortoise populations including mortality from crushing of animals or their burrows, destruction of vegetation, alteration of soil, augmentation of forage (e.g., presence of livestock droppings, and stimulation of vegetative growth or nutritive value of forage plants), and competition for food.

Some observations of tortoises being crushed by livestock exist in the literature, but often with little or no data to allow in-depth evaluation. Berry (1978, p. 28) stated that "smaller tortoises can be crushed easily by cattle or sheep," but provided no data to support the statement. In 1997, a BLM employee documented an incident of a tortoise being stepped on by a cow in the Beaver Dam Slope ACEC (Tim Duck, pers. comm.). No one has rigorously evaluated whether livestock crush a significant proportion of tortoise burrows (USGS 2002). Few cases in the literature document livestock trampling actual burrows and a small number of studies show increased number of collapsed burrows following grazing.

Grazing can affect soils by increasing soil compaction and decreasing infiltration rate (the capacity of the soil to absorb water). A lower infiltration rate means less water will be available for plants and more surface erosion may occur. In a review of studies investigating the hydrologic effect of grazing on rangelands, Gifford and Hawkins (1978) concluded that grazing at any intensity reduces the infiltration rate of the soil. Compared to areas not grazed, heavy grazing reduced infiltration rate by 50 percent and light to moderate intensities reduced infiltration by 25 percent . In contrast, Avery (1998) found significantly greater compaction at a livestock water source, but no difference between protected and grazed areas away from the water source. Soil compaction affects vegetation by reducing water absorption and water availability to plants and making it more difficult for plants to spread their roots, particularly taproots (Adams et al. 1982a, b). Experimental water run-off tests showed moderate grazing areas having 7 times the runoff of light grazing areas and heavily grazed areas had 10 times the runoff as lightly grazed areas (USGS 2002).

Grazing by cattle can alter vegetation in several ways, such as by causing damage from trampling, change in species composition perhaps resulting in type conversion (i.e., change in plant community type), and introduction of invasive plants. Grazing has been implicated in the proliferation of invasive plants in the Mojave Desert (Mack 1981, Jackson 1985, Brooks 1995). On the other hand, trampling by livestock may help to bury seeds and improve germination through their trampling action.

Livestock grazing during the spring months reduces the quantity of available forage for desert tortoise (Berry 1978, Karl 1981, Coombs 1979). Both cattle and desert tortoises consume annual plants in the spring if precipitation has been sufficient for annual production (Esque 1994). At other times, cattle consume primarily shrub species, such as bursage, ratany, and galleta grass. Outside of the spring months or in years when green annual plants are not available, a greater percentage of cactus, shrubs, and dried grasses and annuals are consumed by desert tortoises (Nagy and Medica 1986; Hohman and Ohmart 1980).

In an extensive study, Avery (1998) showed that cattle and tortoise diets overlap (38 percent in early spring, 16 percent in late spring). In late spring in the absence of cattle, tortoises primarily ate herbaceous perennials (91 percent of diet), whereas in the grazed areas, tortoises primarily ate annual grasses (59 percent) followed by herbaceous perennials (21 percent). The species of herbs also differed: in the exclosure, tortoises preferred desert dandelion (*Malacothrix glabrata*), whereas in the grazed areas, they primarily ate the exotic grass, splitgrass (*Schismus barbatus*).

Tortoises expand their home ranges and reproduction is reduced or eliminated when forage availability is very low (Tracy et al. 1994). Forage consumption by cattle exacerbates the effects of low forage availability on desert tortoise reproduction and home range size. Livestock grazing in years with poor rainfall and forage production may result in a reduction in recruitment of young tortoises into the population due to direct competition (Brussard 1994).

Tracy (1996) found that in years of very low annual productivity, such as during low rain years, tortoises lay fewer eggs. They also found that cattle grazing reduced tortoise forage abundance, which also cause tortoises to lay fewer eggs. The conclusion is that, in low rain years, cattle may remove enough forage to reduce tortoise reproductive output, resulting in competition.

No new range improvement projects are currently proposed in desert tortoise habitat; however, new projects could be proposed in the future. Construction and maintenance of range developments could result in minor disturbance of habitat. During construction, maintenance, and inspections of range improvements, some mortality or injury of desert tortoises could result through collisions with vehicles or other equipment. Increased access to new or existing range developments could lead to mortality of desert tortoises through collection, vandalism, crushing by vehicles, and shooting. Construction of range projects would have similar impacts to those described above for construction of artificial water sources.

Livestock grazing during years of abundant annual plant growth could help reduce the risk of wildfire in desert tortoise habitat. However, livestock have facilitated the spread and introduction of nonnative plants, which in turn fuel fires that destroy or severely degrade habitat and can result in direct mortality or injury of tortoises. Changes in vegetation communities induced by grazing may alter the quantity or nutritional value of forage available to tortoises, possibly contributing to malnutrition and elevated risk of contracting or becoming symptomatic for upper respiratory tract disease (URTD). Removing cattle may not affect a return to native plant communities.

Closing areas to grazing could lead to a reduction or cessation of maintenance, abandonment, and/or removal of livestock waters. Vegetation in these areas may or may not regenerate, depending upon the timing and duration of grazing, the extent of long-term changes in species composition, localized erosion, and the extent of soil compaction.

Managing allotments as forage reserves would have similar impacts to those described above for livestock grazing, except that grazing would occur less frequently. Livestock and permittees would be less familiar with the location of waters, forage areas, and other developments, resulting in more widespread, but less intensive impacts. Restoration, vegetation treatments, and water development maintenance would be performed more frequently on forage reserve allotments.

Allotments in the Beaver Dam and Virgin Slope ACECs were placed on winter grazing schedules after 1998. Vegetative trend studies at key areas should provide useful information for evaluating the effects of reducing the grazing season on desert tortoise. Key vegetative species on allotments with desert tortoise have been in late seral or potential natural community for more than a decade, despite many years of pervasive drought. At most key areas, bare ground has decreased, perennial grasses have remained static, and overall trend has also been static. These results suggest that vegetative communities were healthy prior to implementation of grazing restrictions and continue remain at or near their potential. Despite these somewhat encouraging

results, tortoise populations apparently continued to decline. It is clear that some aspects of livestock grazing have minor to moderate effects on desert tortoise and continue to contribute to the myriad of other factors affecting tortoise survival. However, the effects of grazing on desert tortoise and the contribution of this effect relative to other factors continue to be difficult to quantify. Because desert tortoise are long-lived species with low recruitment and because vegetation in the Mojave Desert changes very slowly over time, it may be decades before monitoring reflects the relative contribution of grazing on desert tortoise in the Planning Area.

In an effort to continue to try to determine the relative impacts of changes in grazing season of use on desert tortoise, the FEIS includes proposals to continue to authorize low to moderate levels of grazing in desert tortoise habitats under close monitoring, consistent with the recovery plan. Documenting changes in habitat conditions under various grazing regimes is essential to determining whether or not this is an effective method for reducing threats and promoting recovery of desert tortoise.

Impacts to desert tortoise from authorizing livestock grazing vary from minor to moderate and include both short- and long-term effects. The magnitude of these impacts would be greater for Alternative A than for any other alternative since more area is available for livestock grazing. These effects are not anticipated to be population level or recovery-unit-wide effects, despite the isolation of the Pakoon DWMA/ACEC from other desert tortoise populations.

Mexican Spotted Owl, Bald Eagle, California Condor: Impacts to special status raptors could occur from construction and maintenance of range improvement projects. Negligible impacts could occur to these species in the form of noise, dust, and disturbance resulting from the equipment used for construction and maintenance of projects. These effects would be short-term. Trash, debris and waste materials left on site could be consumed by these birds, though project stipulations require that such trash be gathered and removed from the site.

Welsh's Milkweed (Vermilion only): Impacts to this threatened plant species could occur from trampling by livestock and from construction and maintenance of range improvement projects within its habitat. Minor effects could occur to the species in the form of injury or mortality where vehicles or equipment used for construction and maintenance of projects runs over and crushes the plant. However, it is unlikely that such actions would be authorized where there was a possibility that the species could be impacted and most habitat for the plant is inside wilderness and inaccessible by vehicle. Trampling by livestock is considered an extremely rare occurrence since this species occurs on extremely sandy sites where livestock grazing is rare.

Southwestern Willow Flycatcher (Arizona Strip FO only): Livestock grazing has been identified as a significant contributor to the decline of the Southwestern Willow Flycatcher (Sogge et al 1995). Direct impacts include jostling of nests and other physical disturbances in the nesting areas. Grazing by livestock removes new shoots of native vegetation that could develop into suitable nesting habitat for Southwestern Willow Flycatchers. Indirect impacts include attracting nest parasites such as Brown-headed Cowbirds, slowing regeneration of habitat

areas, and reducing water quantity and quality. Grazing in adjacent upland areas may lead to an increase in erosion, sedimentation, and salinity in riparian habitats. Areas where seasonal grazing restrictions have been put into effect have not been adequately studied to determine the significance of non-growing season grazing practices. The magnitude of these impacts would be greater for Alternative A than for any other alternative since more area is available for livestock grazing.

Woundfin Minnow and Virgin River Chub (Arizona Strip FO only): Effects to Virgin River fishes from implementation of livestock grazing management actions would be similar to those described above for Southwestern Willow Flycatcher. Direct impacts include livestock stepping on fish eggs or fry, resulting in injury or mortality. Grazing by livestock removes cover plants that shade watering areas and keep temperatures within acceptable range for fish. Continued use by livestock leads to degradation and collapse of banks and loss of vegetation. Livestock wastes foul water sources and change the local water quality conditions. Effects on fish food supplies have not been well studied. Grazing in adjacent upland areas may lead to an increase in erosion, sedimentation, and salinity in the riparian habitats. The magnitude of these impacts would be greater for Alternative A than for any other alternative since more area is available for livestock grazing.

Brady Pincushion Cactus, Holmgren Milk-vetch, Jones' Cycladenia, and Siler Pincushion Cactus (Arizona Strip FO only): Livestock grazing may lead to long-term changes in soil and vegetation community dynamics, leading to unfavorable changes for rare plant species. However, research in this area has been inconclusive. Herbivory on special status plant species by livestock does not appear to be a problem. Injury or mortality of special status plants due to trampling by livestock has been infrequently documented in Brady and Siler pincushion cactus habitats. While the occurrence of injury or mortality from trampling is uncommon, typically less than three percent of plots, it exceeds the level of a discountable effect. See also the effects of livestock grazing on vegetation as described above for desert tortoise.

Impacts from Recreation

A wide variety of recreational activities occur all across the Arizona Strip. Commercial activities and organized non-commercial events of more than 50 participants would generally be authorized with a special recreation permit (SRP). Permits of this type typically allow for vehicular events such as motorcycle races or OHV or horseback tours, guided hiking or hunting trips, research oriented field schools, or orienteering events such as geo-caching. SRPs include conservation measures and other stipulations to reduce or eliminate effects to special status species.

All Special Status Species: Impacts to special status species from maintenance or restoration of natural remote settings would vary depending upon ecological zone and the method used to conduct the restoration. Impacts would be the same as those described for vegetation treatments

under Impacts from Air, Water, and Soil Resources and Impacts from Vegetation and Fire and Fuels Management.

Foot traffic through sensitive areas could trample, injure, or kill special status plants. Camping increases the likelihood of such effects. Collection of dead and down wood for firewood would increase the extent and severity of impacts to vegetation. Use restrictions on these types of activities help reduce or eliminate adverse impacts to special status plants.

Desert Tortoise (Parashant and Arizona Strip FO): Desert tortoise could be disturbed, injured, or killed as a result of the operation of motorized vehicles within their habitat. Authorized actions such as commercial recreation or competitive events increase the probability of death or injury of these animals resulting from collisions. Under this alternative, all competitive vehicular speed events would be prohibited in the Pakoon DWMA/ACEC and organized non-speed events would be limited to designated routes and would only be authorized between October 15 and March 15. Non-commercial vehicular events of less than 50 vehicles are non-discretionary actions. Minor to moderate adverse effects could result from vehicles colliding with desert tortoise from any of these events. The probability of collisions would be reduced dramatically where vehicle use is limited to the inactive season for desert tortoise.

Limiting vehicle camping to within 50 feet of designated routes would strictly limit off-highway driving and prevent creation of new routes that otherwise might occur by recreationists accessing camping sites. Campers in the Pakoon DWMA/ACEC are not commonly encountered, except perhaps during the hunting season. Some tortoise mortality and crushing of burrows could occur as a result of vehicles pulling off the road for camping, horseback riding, mountain biking, or other recreational pursuits.

Impacts to desert tortoise from authorizing recreational activities vary from minor to moderate and could be both short- and long-term.

Mexican Spotted Owl, Bald Eagle, and California Condor: Bird watching, big game hunting, and wildlife viewing are not BLM-authorized actions, though they are promoted in the RMP. Bird-watchers are drawn from across the country to catch a glimpse of a rare species, such as California Condor. However, the probability of recreational activities of this nature leading to contact between humans and special status raptors is low everywhere except in the immediate vicinity of the Condor release site at the Vermilion Cliffs, within high density recreation areas such as Paria Canyon, and in the immediate vicinity of Condor nesting, roosting, or foraging areas outside of the Planning Area. The combination of high mobility and the implementation of conservation measures greatly reduce the probability and severity of direct impacts to these species resulting from disturbance associated with recreational activities. The effects of hunting are not analyzed here because the authority for authorizing hunting permits lies with AGFD.

Southwestern Willow Flycatcher and Yuma Clapper Rail (Arizona Strip FO only): Recreational activities at the Beaver Dam Confluence area could lead to disturbance of Willow

Flycatcher or Clapper Rail nesting sites by humans. The probability of nest abandonment from such activities is probably low, but not discountable. In addition, trash and debris at the site could increase the presence of nest parasites of Willow Flycatchers, such as Brown-headed Cowbirds.

Woundfin Minnow and Virgin River Chub (Arizona Strip FO only): Recreation that could affect fish in the Virgin River are primarily dispersed, non-permitted activities such as swimming, wading, bird-watching, kayaking, mountain biking, and a variety of social activities. Most such activities occur during the spring and early summer months. Prior to this time, water levels are frequently too high and later in the summer the air temperatures are too high. These types of recreational activities could lead to disturbance of native fishes from breeding and/or foraging areas. The level of effect of these types of actions is so low that they have a negligible effect on native fish populations. Conservation measures in this Plan would further reduce the potential for adverse affects on native fish and wildlife populations.

Brady Pincushion Cactus, Holmgren Milk-vetch, Jones' Cycladenia, and Siler Pincushion Cactus (Arizona Strip FO only): Foot traffic through sensitive areas could trample, injure, or kill special status plants. Camping increases the likelihood of such effects. Collection of dead and down wood for firewood would increase the extent and severity of impacts to vegetation. Use restrictions on these types of activities help reduce or eliminate effects to special status plants. Because the likelihood for these events to occur in special status plant habitats is very low, the potential for these impacts is considered discountable.

Impacts from Lands and Realty Management

All Special Status Species: In the Monuments, impacts to special status species could result from issuance of ROWs necessary for access and/or maintenance needs to private or state in holdings, ROWs within the boundaries of existing ROWs or designated corridors, and where site-specific NEPA analysis determines that impacts to Monument objects or values would be negligible.

In the Arizona Strip FO, impacts to special status species could result from land tenure adjustments such as acquisition or disposal and issuance of ROWs. This alternative includes land exchanges or sales of up to 1,162 acres of BLM lands in the Virgin River corridor. Because none of the land exchanges involve riparian habitat, there would be no direct loss of riparian habitat; however there could be interrelated effects on adjacent riparian areas. For example, development and use of water resources on disposed lands that either drain into the Virgin River or supply water to an aquifer with connections to the river could lead to adverse effects to listed species.

Desert Tortoise (Parashant and Arizona Strip FO): In general, all special status species habitat would be retained in federal ownership, including all of the higher density tortoise habitat lands (formerly called Category I and II). These higher quality areas are all within the

boundaries of the Beaver Dam Slope or Virgin Slope ACEC. However, rapid growth in the Littlefield area has led to development on three or more sides of some parcels of low-density (formerly called Category III) tortoise habitat. These parcels are very difficult for the BLM to manage effectively. Depending upon the type of development, many of the resource values previously present on this land have been or will be lost. Public lands in Clark and Lincoln Counties, Nevada, and Washington County, Utah, are experiencing similar growth. As a result, public land sales have occurred or will occur in the future in these areas.

This Plan provides a long-term approach to resource management in the Littlefield area by focusing future community growth towards parcels that are difficult to manage and where resource damage has previously occurred. The majority of these areas are between the I-15 freeway and the Virgin River. Tortoise densities between these impassable barriers are very low, with little or no immigration from outside areas. Focusing growth and development in specific low-density areas emphasizes the BLM's intent to give highest priority for management to higher density lands within the ACECs. Some of these parcels would be identified for disposal under the R&PP act while others would be identified for competitive sale. Under the R&PP option, the BLM would only authorize disposal for recreational or public purposes, such as schools, libraries, and other community based developments. This would allow the BLM a wider range of mitigation options. Both types of disposal would allow the BLM to collect compensation monies that could be applied to habitat improvement projects for desert tortoise. For these reasons, the BLM has decided to identify these particular parcels of low-density tortoise habitat for disposal under the FEIS.

Impacts from issuance of ROWs would vary based upon the nature and purpose of the ROWs. Impacts in Parashant would be minor as any new ROWs or associated actions that had more than a negligible impact on Monument objects or values would not be authorized. Impacts in the Arizona Strip FO would be minor to moderate depending upon the nature of the action. New ROWs could increase vehicle traffic along existing routes, resulting in increased potential for injury or death of desert tortoise.

Southwestern Willow Flycatcher, Yuma Clapper Rail, Woundfin Minnow, and Virgin River Chub (Arizona Strip FO only): Removal of lands from federal ownership could have long term effects on urban development along the Interstate 15 corridor. An increase in urban development along the Interstate 15 corridor could lead to a decrease in water quantity and quality. An increase in the demand for water due to a larger human population could result in a lowered water table and possibly reduced flows in the river and associated riparian areas. However, hydrologic studies indicate that local groundwater aquifers are well below river level and may have little effect on flows in the river (ADEQ 1999). Despite this, development of lands adjacent to riparian areas along the river could lead to a reduction in the size and quality of riparian habitat. Direct impacts to these species include loss of available habitat for breeding, feeding, or sheltering activities, and injury or mortality as land is developed. An increase in development would likely result in an increase in the number of people using riparian areas,

increasing the chances of fire, OHV use, predation by pets and nest parasites, and the amount of trash and debris.

Alternative B

Impacts from Travel Management

Impacts to special status species would be the same as those described under Alternative A; however, due to the increase in number of miles of roads closed or open for administrative use only, impacts would occur over a smaller area than under any other alternative.

Impacts from Vegetation and Fire and Fuels Management

Impacts to special status species would be similar to those described under Alternative A, with the following exceptions and additions:

Using DFCs and DPC objectives to make decisions would enhance protection of sensitive resources and benefit uses by emphasizing consideration of those uses in planning. Employing seasonal restrictions on uses would also benefit special status species. Identifying ecological zones with unique DFCs, DPCs, and vegetation management actions would increase management capabilities.

Desert Tortoise: Under Alternative B, no planned vegetation treatment projects would be authorized in the Mohave Desert or Mohave-Great Basin Transition ecological zones. Within desert tortoise habitat, fire use would not be appropriate and would not be authorized.

The Pakoon WHA would be closed to the collection of vegetative products. Use and/or sale of vegetation products outside the WHA would have localized, negligible to minor impacts on desert tortoise.

Impacts from implementation of noxious weed management actions would be similar to those described under Alternative A, except that vegetative treatments would not be authorized in tortoise habitat. This would limit the ability to do noxious weed treatments. Effects of these actions on desert tortoise are expected to be negligible to minor.

Southwestern Willow Flycatcher and Yuma Clapper Rail (Arizona Strip FO only): Under this alternative, the sale of vegetation products in the Virgin River Corridor ACEC would not be authorized. However, there is no prohibition against such actions within the riparian zone at Kanab Creek. In addition, impacts could result from collection of firewood for personal use. Direct, negligible to minor impacts could result if nests are disturbed during collection of wood. This is not considered a likely occurrence. Generally, little if any fuelwood is available in habitat areas for these species. However, collection of firewood could reasonably be expected for building campfires. Campfires increase the probability of fire escaping and burning through

the habitat area. Impacts from fire use and suppression are described below in the Impacts for Vegetation and Fire and Fuels Management section.

Impacts from Soil, Water and Air Resources

Impacts to special status species in Parashant and Vermilion would be similar in nature and scope to those described under Alternative A. Impacts in the Arizona Strip FO would also be similar to those described under Alternative A, with the following exceptions/additions:

Desert Tortoise (Arizona Strip FO only): In the Arizona Strip FO, no watershed restoration or treatment projects would be authorized in the Mojave Ecological Zone, resulting in no impacts.

Southwestern Willow Flycatcher, Yuma Clapper Rail, Woundfin Minnow and Virgin River Chub (Arizona Strip FO only): Under Alternative B, no watershed restoration and treatment projects would be authorized in the Riparian Ecological Zone, resulting in no impacts.

Impacts from Fish and Wildlife

Impacts to special status species from wildlife management actions would be similar to those described under Alternative A, with the following exceptions and additions:

Providing access to public lands for the hunting and wildlife viewing would maintain routes through the habitat. Impacts to special status species from such routes would be the same as those described under Alternative A, Impacts from Transportation and Access.

Identification of priority wildlife species would benefit these species by increasing consideration for them in project design and implementation.

Impacts from Special Status Species

Impacts to special status species would be similar in scope and extent to those described under Alternative A, with the following exceptions/additions:

Desert Tortoise: Revocation of the Pakoon ACEC in Parashant would have a negligible effect on desert tortoise as management within the area would continue unchanged. While the name would be changed to the Pakoon WHA, the boundaries would remain the same as the former Pakoon ACEC. Management actions would be the same as under Alternative A and would thus result in the same impacts.

Relict Leopard Frog (Parashant only): Introducing relict leopard frogs at Pakoon Springs or other locations within Parashant would have short-term minor to moderate effects on special status bird species using the area (American Bittern, White-faced Ibis, and possibly Yellow-billed Cuckoo), depending upon the methods used during site preparation. Ponds at Pakoon

Springs would require complete removal of water, vegetation, and soil sterilization to remove bull frogs and other undesirable exotic species.

Brady Pincushion Cactus, Siler Pincushion Cactus, Jones' Cycladenia, Holmgren Milk-vetch, Fickeisen Plains Cactus, Gierisch Mallow, and Paradine Plains Cactus (Arizona Strip FO only): Designation of the Marble Canyon, Johnson Spring, Lost Spring Mountain, Moonshine Ridge, Fort Pearce, Lone Butte, Black Knolls, Twist Hills, Clayhole, Buckskin, and Coyote Valley ACECs would be wholly beneficial for these listed plant species due to the proposed management prescriptions and increased focus on the needs of these species.

Impacts from Minerals (Arizona Strip FO only)

Impacts to special status species would be similar to those described under Alternative A.

Impacts from Livestock Grazing

Impacts to special status species from livestock grazing and related actions would occur over a smaller area than under other alternatives due to fewer areas that would be available for grazing. The types of impacts would be the same as those described under Alternative A, with the following exceptions/additions.

Desert Tortoise (Parashant and Arizona Strip FO): Making all desert tortoise habitats within the Planning Area unavailable to grazing would reduce the level of impact and potential for adverse modification to critical habitat. Remaining areas of desert tortoise habitat within the Monument have been burned and converted to annual grass communities. As such, these areas no longer possess the primary constituent elements of critical habitat and were therefore excluded from consideration as unavailable for grazing. The majority of the remaining areas of critical habitat within the Monument that was previously impacted by livestock grazing would begin to regenerate. Once cattle are removed, direct or indirect threats from livestock grazing would occur. The Mojave Desert communities would slowly regenerate, though wildfires would likely continue to periodically burn through the habitat. Livestock waters would require removal, leading to short-term habitat disturbance.

Impacts from Recreation

Impacts would be similar in scope and magnitude as those described under Alternative A.

Impacts from Lands and Realty

Impacts to special status species would be the same as those described under Alternative A for Parashant and Vermilion. In the Arizona Strip FO, the following would apply:

All Special Status Species: Impacts to special status species in the Arizona Strip FO could result from land tenure adjustments such as acquisition or disposal and issuance of ROWs. The magnitude of these impacts would be less under this alternative than under any other since fewer acres would be identified for disposal. Impacts from ROWs would vary by the type and nature of the action that precipitates the need for the ROW.

Alternative C

Impacts from Travel Management

Impacts to special status species would be similar to those described under Alternative A. However, due to the reduced number of roads open for public use under this alternative, the magnitude of impacts would be less than that under Alternative A, but greater than under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

Impacts from vegetation treatments in all ecological zones could occur on more acres than under Alternative B, but less than under all other alternatives. The potential for impacts would be minimized as treatment projects would not be authorized unless some long-term benefits to the species were anticipated.

Southwestern Willow Flycatcher, Yuma Clapper Rail, Woundfin Minnow, and Virgin River Chub (Arizona Strip FO only): Impacts to riparian and aquatic special status species from vegetation treatments in this ecological zone would be the same as those described under Alternative A. Short term and long term impacts to these species could occur in the form of disturbance, temporary increases in erosion, and temporary displacement of these species from their habitats. Under this alternative, up to 1,000 acres in the Arizona Strip FO could be treated. Even using a worst-case scenario, no long-term loss of riparian habitat would occur because failed treatments would likely result in rapid revegetation by the same invasive exotics intended for removal. Treatment projects would be limited to cases where the project was necessary to provide long-term benefits to riparian and aquatic species.

Desert Tortoise (Parashant and Arizona Strip FO): Impacts to desert tortoise from vegetation treatments in this ecological zone would be the same as those described under Alternative A. Under this alternative, up to 70,000 acres of Mojave Desert habitat could be treated in Parashant and up to 5,000 acres in the Arizona Strip FO. Using a worst-case analysis, up to 14,000 acres of wildlife habitat in Parashant and up to 1,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low since vegetation treatments in this community would be limited in size and extent to minimize impacts to desert tortoise. Treatment projects would be limited to cases where the project was necessary to provide long-term benefits to desert tortoise.

Brady Pincushion Cactus, Siler Pincushion Cactus, Jones' Cycladenia, Holmgren Milk-vetch, Fickeisen Plains Cactus, Gierisch Mallow, and Paradine Plains Cactus (Arizona Strip FO only): Impacts to special status plants from vegetation treatments in the Plains - Grassland Ecological Zone would be the same as those described under Alternative A. Under this alternative, up to 50,000 acres of habitat could be treated in the Arizona Strip FO. Using a worst case analysis, up to 10,000 acres of could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low since vegetation treatments in the habitat of these species would be limited to cases where the project was necessary to provide long-term benefits to one or more special status plants.

Impacts from Soil, Water and Air Resources

Impacts to special status species would be similar in scope and extent to those described under Alternative A. The magnitude of these impacts would be greater than for Alternative B, but less than that of other alternatives.

Impacts from Fish and Wildlife

Impacts to special status species would be similar in scope and extent to those described under Alternative A. The addition of new Watchable Wildlife areas in this alternative would increase visitation in sensitive habitats, thus increasing impacts.

Impacts from Special Status Species

In Parashant, impacts to special status species would be similar in scope and extent to those described under Alternative B. In Vermilion and the Arizona Strip FO, impacts would be similar to those described under Alternative A. The following exceptions/additions also apply:

Relict Leopard Frogs (Parashant only): Introduction of relict leopard frogs or other special status species at Pakoon Springs and/or Tassi Springs and Ranch would likely require extensive cattail and bullfrog eradication efforts. Permanently converting this habitat to a flowing water system could reduce or eliminate the habitat needs of other special status species, such as Yuma Clapper Rail, and preclude efforts to introduce such other species.

Desert Tortoise (Parashant and Arizona Strip FO): Augmenting existing Burrowing Owl populations and installing artificial nest burrows in the Pakoon Basin (Parashant) would have minor to moderate, long-term direct impacts to local tortoise populations. Burrowing Owls would likely prey upon young tortoise, leading to direct mortality and population declines for the species.

Jones' Cycladenia, Holmgren Milk-vetch, Fickeisen Plains Cactus, Gierisch Mallow, and Paradine Plains Cactus (Arizona Strip FO only): Failure to designate the Lone Butte, Black Knolls, Twist Hills, Clayhole, Buckskin, and Coyote Valley ACECs would not provide these species the same protections available within an ACEC.

Impacts from Livestock Grazing

Impacts would be similar in nature and scope to those described under Alternative A. The magnitude of adverse effects would be greater than under Alternative B, but less than under other alternatives.

Impacts from Minerals (Arizona Strip FO only)

Impacts to special status species would be similar to those described under Alternative A.

Impacts from Recreation

Impacts would be similar in nature and scope to those described under Alternative A.

Impacts from Lands and Realty

Impacts to special status species would be similar in nature and scope to those described under Alternative A for Parashant and Vermilion. The following additions/modifications apply to the Arizona Strip FO:

All Special Status Species (Arizona Strip FO only): Impacts to special status species could result from land tenure adjustments such as acquisition or disposal and issuance of ROWs. The magnitude of these impacts would be greater than under Alternatives A and B and the same as under Alternatives D and E. Impacts from ROWs would vary by the type and nature of the action that precipitates the need for the ROW.

Alternative D

Impacts from Travel Management

Impacts would similar to those described under Alternative A. This alternative includes fewer miles of roads closed and more miles open than any other alternative except Alternative A. As a result, the magnitude of impacts would be greater than that of Alternatives B, C, and E, but less than Alternative A.

Impacts from Vegetation and Fire and Fuels Management

The magnitude of impacts from vegetation management would be greater than under Alternatives B, and C, equal to Alternative E, but less than that of Alternative A. See the section Impacts to Vegetation from Vegetation Treatments for more detailed analysis of methods used and total treatment acreages. Impacts from vegetation treatments in all ecological zones could occur on more acres than under any other alternative. The potential for impacts would be

minimized as treatment projects would not be authorized unless some long-term benefits to the species were anticipated.

Southwestern Willow Flycatcher, Yuma Clapper Rail, Woundfin Minnow and Virgin River Chub (Arizona Strip FO only): Impacts to riparian and aquatic special status species from vegetation treatments in this ecological zone would be the same as those described under Alternative A. Short-term and long-term impacts to these species could occur in the form of disturbance, temporary increases in erosion, and temporary displacement of these species from their habitats. Under this alternative, up to 5,000 acres in the Arizona Strip FO could be treated. Even using a worst-case scenario, no long-term loss of riparian habitat would occur because failed treatments would likely result in rapid revegetation by the same invasive exotics intended for removal. Treatment projects would be limited to cases where the project was necessary to provide long-term benefits to riparian and aquatic species.

Desert Tortoise (Parashant and Arizona Strip FO): Impacts to desert tortoise from vegetation treatments in the Mojave Desert Ecological Zone would be the same as those described under Alternative A. Under this alternative, up to 80,000 acres of Mojave Desert habitat could be treated in Parashant and up to 10,000 acres in the Arizona Strip FO. Using a worst case analysis, up to 16,000 acres of wildlife habitat in Parashant and up to 2,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low since vegetation treatments in the Mojave Desert Ecological Zone would be limited in size and extent to minimize impacts to desert tortoise. In addition, treatment projects would be limited to cases where the project was necessary to provide long-term benefits to desert tortoise.

Brady Pincushion Cactus, Siler Pincushion Cactus, Jones' Cycladenia, Holmgren Milk-vetch, Fickeisen Plains Cactus, Gierisch Mallow, and Paradine Plains Cactus (Arizona Strip FO only): Impacts to special status plants from vegetation treatments in the Plains - Grassland Ecological Zone would be the same as those described under Alternative A. Under this alternative, up to 100,000 acres of habitat could be treated in the Arizona Strip FO. Using a worst case analysis, up to 20,000 acres of could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low since vegetation treatments in the habitat of these species would be limited to cases where the project was necessary to provide long-term benefits to one or more special status plants.

Impacts from Soil, Water and Air Resources

Impacts would be similar in nature and scope to those described under Alternative A. The magnitude of these impacts would be less than that of Alternative A, equal to that of Alternative E, and less than that of Alternatives B and C.

Impacts from Fish and Wildlife

Impacts to would be similar in scope and extent to those described under Alternative C.

Impacts from Special Status Species

Impacts would be similar in scope and extent to those described under Alternative B, with the following additions and/or exceptions:

Relict Leopard Frogs (Parashant only): Impacts would be similar in scope to those described under Alternative C.

Desert Tortoise (Parashant and Arizona Strip FO): Impacts would be similar to those described under Alternatives B and C, but would occur on an additional 7,982 acres in the Pakoon WHA at Grand Gulch Wash.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be similar in nature and scope to those described under Alternative A.

Impacts from Livestock Grazing

Impacts would be similar in nature and scope to those described under Alternative A.
The magnitude of impacts would be less than that of Alternative A, but greater than for other alternatives.

Impacts from Recreation

Impacts would be similar in nature and scope to those described under Alternative A.

Impacts from Lands and Realty

Impacts would be similar in nature and scope to those described under Alternative A for Parashant and Vermilion. The following apply to the Arizona Strip FO:

All Special Status Species (Arizona Strip FO only): Impacts to special status species could result from land tenure adjustments such as the acquisition or disposal and issuance of ROWs. The magnitude of these impacts would be greater than under Alternatives A and B but the same as under Alternatives C and E. Impacts from ROWs would vary by the type and nature of the action that precipitates the need for the ROW.

Alternative E: Proposed Plan

Impacts from Travel Management

Impacts would be similar to those described under Alternative A. In Parashant, 1,404 miles would remain open for motorized use by the public, a decrease of 311 miles (18 percent) compared to Alternative A. In Vermilion, 377 miles would remain open for motorized use by the public, a decrease of 69 miles (15 percent) compared to Alternative A. In the Arizona Strip FO, 2 miles of routes would be closed initially, so the magnitude of impacts to wildlife would be similar to Alternative A. However, in the future, route designation decisions would be made and it is likely that some roads would be closed. Due to the miles of road open for public use under this alternative, the magnitude of impacts would be greater than under Alternatives B and C, but less than under Alternatives A and D.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as under Alternative D. The potential for impacts would be minimized as treatment projects would not be authorized unless some long-term benefits to the species were anticipated.

Southwestern Willow Flycatcher, Yuma Clapper Rail, Woundfin Minnow, and Virgin River Chub (Arizona Strip FO only): Impacts to riparian and aquatic special status species from vegetation treatments in this ecological zone would be the same as those described under Alternative A. Short-term and long-term impacts to these species could occur in the form of disturbance, temporary increases in erosion, and temporary displacement of these species from their habitats. Under this alternative, up to 5,000 acres in the Arizona Strip FO could be treated. Even using a worst-case scenario, no long-term loss of riparian habitat would occur because failed treatments would likely result in rapid revegetation by the same invasive exotics intended for removal. In addition, treatment projects would be limited to cases where the project was necessary to provide long-term benefits to riparian and aquatic species.

Desert Tortoise (Parashant and Arizona Strip FO): Impacts to desert tortoise from vegetation treatments in this ecological zone would be the same as those described under Alternative A. Under this alternative, up to 80,000 acres of Mojave Desert habitat could be treated in Parashant and up to 10,000 acres in the Arizona Strip FO. Using a worst-case analysis, up to 16,000 acres of wildlife habitat in Parashant and up to 2,000 acres in the Arizona Strip FO could be lost from failed vegetation treatment projects. The probability for this occurrence is considered low since vegetation treatments in this community would be limited in size and extent to minimize impacts to desert tortoise. In addition, treatment projects would be limited to cases where the project was necessary to provide long-term benefits to desert tortoise.

Brady Pincushion Cactus, Siler Pincushion Cactus, Jones' Cycladenia, Holmgren Milk-vetch, Fickeisen Plains Cactus, Gierisch Mallow, and Paradine Plains Cactus (Arizona Strip FO only): Impacts to special status plants from vegetation treatments in the Plains - Grassland Ecological Zone would be the same as those described under Alternative A. Under this alternative, up to 100,000 acres of habitat could be treated in the Arizona Strip FO. Using a worst-case analysis, up to 20,000 acres of could be lost from failed vegetation treatment projects. The probability for this occurrence is considered very low since vegetation treatments in the habitat of these species would be limited to cases where the project was necessary to provide long-term benefits to one or more special status plants.

Impacts from Soil, Water and Air Resources

Impacts would be the same as under Alternative D.

Impacts from Fish and Wildlife

Impacts to would be similar in scope and extent to those described under Alternative C.

Impacts from Special Status Species

Impacts would be similar in scope and extent to those described under Alternative A for Vermilion and the Arizona Strip FO. Impacts would be similar to those described under Alternative B for Parashant. The following additions and/or exceptions would also apply:

Relict Leopard Frogs (Parashant only): Impacts would be similar to Alternative C.

Desert Tortoise (Parashant and Arizona Strip FO): As under Alternatives A and B, Burrowing Owl populations would not be augmented in Parashant, eliminating the potential for adverse effects from this action.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be similar to those described under Alternative A.

Impacts from Livestock Grazing

The magnitude of impacts would be less than that of Alternatives A and D, but greater than under the other alternatives.

Mexican Spotted Owl, Bald Eagle, California Condor: As with Alternative B, closing the River Pasture of the Lees Ferry Allotment to livestock grazing would further reduce potential for impacts to special status raptors that might use Paria Canyon.

Impacts from Recreation

Impacts would be similar in nature and scope to those described under Alternative A.

Impacts from Lands and Realty

Impacts would be similar in nature and scope to those described under Alternative A in Parashant and Vermilion. In the Arizona Strip FO, impacts would be the same as under Alternatives C and D.

Cumulative Impacts

The geographic area for analysis of cumulative impacts to special status species is the southwestern region of the United States. The distribution of several listed species extends well beyond the Planning Area boundary. For example, Siler pincushion cactus is also found in portions of southern Utah; desert tortoise range widely across the Mojave Desert; Southwestern Willow Flycatcher, Yuma Clapper Rail, and Yellow-billed Cuckoo are found in riparian habitats throughout the southwest; and Mexican Spotted Owls may be found in canyon and mixed conifer forests in the region. Activities that occur virtually anywhere within the Virgin River watershed have the potential to affect woundfin minnow, Virgin chub, and other native fishes. Bald Eagles are even more widely distributed, but the lack of consistent or significant use by this species in the Planning Area was grounds for limiting the area of consideration to the southwestern U.S.

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

Community expansion has also led to increased pressure for water and developable lands. Land disposals outside of ACECs/critical habitat have reduced available desert tortoise habitat by up to 400 acres since 1973. Issuance of ROWs outside of ACECs/critical habitat has also reduced tortoise habitat by as much as 1,859 acres over the same time period. Acquisition of special status species habitat within ACECs has increased protection of the species by shifting management emphasis toward conservation. Demand for water for industrial, irrigation, and culinary use has had major long-term effects on special status fish. Disruptions of flow regimes from dams and diversions have altered habitat for fish and riparian dependent species. Reductions in water quality have had similar long-term effects. Introduction of non-native plants and animals have resulted in adverse effects to listed species from competition for resources, trampling, predation, injury, and death. Tamarisk invasion in riparian areas has resulted in

reductions of flow for native fishes, reductions in the overall size of the vegetative community, increased temperature and salinity, and increased risk of fire. However, the invasion of tamarisk has also increased available nesting habitat for Southwestern Willow Flycatcher.

Wildfires have reduced available desert tortoise habitat by over 150,000 acres in the Pakoon WHA through conversion of the vegetation from native communities to exotic annual grasses. Mineral development has led to reduction of habitat quality and physical disturbance in desert tortoise and endangered plant habitats. Livestock grazing has increased the danger of trampling of listed species such as endangered plants and desert tortoise. During years of drought and/or low productivity, livestock grazing has reduced forage availability for desert tortoise. Some 128,005 acres of desert tortoise habitat have been made unavailable to livestock grazing since 1998. An additional 144,027 acres of desert tortoise habitat have seasonal grazing restrictions. These actions has reduced or eliminated competition with livestock in these areas.

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

Implementation of plan decisions is expected to improve conditions for special status species by giving these species priority status, focusing management attention, and reducing or eliminating actions that lead to adverse effects. Among species currently listed, the status of desert tortoise, relict leopard frog, Bald Eagle, Southwestern Willow Flycatcher, Yuma Clapper Rail, Yellow-billed Cuckoo, California Condor, Mexican Spotted Owls, Burrowing Owls, Siler pincushion cactus, Jones' cycladenia, Welshs milk-weed, Brady pincushion cactus, and Holmgren milk-vetch should remain stable or improve.

Impacts from livestock grazing on desert tortoise would be minimized. Water use in the region would continue to increase, affecting flows in the Virgin River and continuing to cause a decline in populations of woundfin minnow and Virgin River chub. Efforts to remove or reduce tamarisk would increase in scope and size, leading to localized impacts but ultimately increasing the size and quality of habitat for riparian dependent species such as Southwestern Willow Flycatcher, Yuma Clapper Rail, and Yellow-billed Cuckoo. Reduction in tamarisk would also increase flows for Virgin River fishes. Increased demand for land for community services and recreational uses would occur, particularly in the area around Mesquite and Littlefield/Beaver Dam. Assuming land ownership follows the Proposed Plan for this RMP, impacts would continue to increase at modest levels. The demand for new lands for development would likely lead to development of one or more Habitat Conservation Plans, providing compensation funds and other benefits to desert tortoise and riparian dependent birds. However, such plans also include compromises in the form of further habitat loss and fragmentation. As adjacent lands are

developed, feedlots and agricultural fields adjacent to riparian areas would be reduced or eliminated, altering, and perhaps decreasing available habitat for Brown-headed Cowbirds. This could result in a beneficial effect to Southwestern Willow Flycatchers.

WILD BURROS

Impacts to Burros

Wild Burros have only been known to populate the area around Lower Grand Wash Cliffs, Grand Wash Bay, and Tassi Springs of Parashant, which includes BLM and NPS lands. To protect the Mojave population of the desert tortoise, the herd management level was set at zero in the Arizona Strip RMP Mojave Desert Amendment (BLM 1998). The Lake Mead NRA Burro Management Plan (1995) established those areas populated with burros within the NRA as zero use. These decisions would be carried through under all the alternatives. As a result, any burros who enter the planning area would continue to be removed, as funding and resources allow.

CULTURAL RESOURCES

This section presents potential impacts of the alternatives on cultural resources, specifically archaeological, historical, and resources of importance to American Indians, as determined through changes in the resources or access to them. The locations of most cultural resource sites in the Planning Area are not known. See Chapter 3 for a discussion of cultural resources in the Planning Area.

The archaeological, historical, and/or traditional cultural property (TCP) settings may contribute to a site's eligibility for placement on the NRHP. Such eligibility may be affected if such settings are altered, disturbed, or destroyed.

Archaeological and historical resources may be impacted by unauthorized collection and excavation, vandalism, erosion, trampling, OHV use off-road, fire, soil compaction, and mechanized surface disturbance. Indirect impacts may cause surface disturbance that allows subsequent soil erosion and undermining of sites and structures. Indirect impacts may also allow access or lack of access for vandalism.

Resources of importance to American Indians may be impacted by unauthorized collection, vandalism, erosion, trampling, OHV use off-road, fire, mechanized surface disturbance, and loss of access to sacred or traditional use areas.

Methods and Assumptions

To analyze the potential effects of the alternatives on archaeological and historical resources, information was gathered from inventories and excavations in and adjacent to the Planning Area; however, approximately 3 percent of the Planning Area has been inventoried and only a handful

of excavations have been conducted. The analysis is also based on professional expertise of BLM specialists at the Arizona Strip FO and the NPS staff at Lake Mead NRA and a review of the relevant scientific literature.

Indians, information was gathered through consultation with tribal governments and individual tribal members, the Cultural Landscape and Place Name Study (Stoffle et al. 2004; Austin and Dean 2004), and a review of relevant literature.

Effects are quantified where possible. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible. The following guidance was used to describe the intensity of impacts to archaeological and historic resources:

Negligible: The impact would not be detectable. The effect on archaeological or historic sites would be at the lowest levels of detection, barely measurable with any perceptible consequences, either beneficial or adverse, on archaeological or historic resources.

Minor: The impact would be detectable. The beneficial or adverse effect on archaeological or historic sites would be measurable or perceptible, but it would be slight and localized within a relatively small area for a site or group of sites. The action would not affect the character or diminish the features of a NRHP eligible or listed site and would not have a permanent effect on the integrity of any site.

Moderate: The impact would be readily apparent. The adverse impact would be measurable and perceptible. The action would change one or more character-defining features of an archaeological or historic resource, but it would not diminish the integrity of the resource to the extent that its NRHP eligibility would be jeopardized.

Major: The impact would be severe. The adverse impact on archaeological or historic sites would be substantial, noticeable, and permanent. For NRHP eligible or listed archaeological sites, the action would change one or more character defining features of the resource, diminishing the integrity of the resource to the extent that it would no longer be eligible for listing in the NRHP.

The following guidance was used to describe the intensity of impacts to resources of importance to American Indians:

Negligible: The impact on American Indian areas of concern and access would be at the lowest levels of detection, barely measurable with any perceptible consequences, either beneficial or adverse.

Minor: The impact on American Indian areas of concern and access would be measurable or perceptible, but it would be slight and localized in a relatively small area. The action would not affect the character or access to traditional use or sacred areas. It would not have a permanent effect on the integrity of any ethnographic resource or traditional use area.

Moderate: The impact would be measurable and perceptible. The action would change one or more characteristics or defining features of the ethnographic resource or traditional use area, but it would not diminish the integrity of the resource to the extent that it would no longer qualify for the NRHP. Access to sacred or traditional use areas would be affected and could cause changes in traditional use patterns.

Major: The impact on resources of importance to American Indians would be substantial, noticeable, and permanent. The action would change or affect one or more character defining features of an ethnographic resource or traditional use area; diminish the integrity of the resource to the extent that it no longer would be able to sustain traditional or sacred uses; or prevent access to sacred or traditional use areas.

The area of analysis for cumulative effects on archaeological and historic resources and resources of importance to American Indians was defined as northern Arizona, southwestern Utah, and southeastern Nevada.

The following assumptions are made for cultural resources:

1. All laws for the management and protection of cultural resources would be followed, to the extent allowed by budget and available personnel.
2. Section 106 inventories and mitigation would be conducted for all proposed projects, as required by NHPA, under each alternative.
3. Some proactive Section 110 inventory, research, stabilization, or preservation would be accomplished in the Planning Area each year.
4. NRHP listed and some NRHP eligible sites as well as the cultural resources in the ACECs would be monitored for vandalism and protected or stabilized, as necessary.
5. All surface disturbing activities include mitigation to reduce impacts to cultural resources. Analysis of impacts includes all mitigation.

Impacts to Archaeological and Historical Resources

Impacts to archaeological and historical resources in the Planning Area would result from actions proposed under the following resource management programs:

- Travel Management
- Wilderness Characteristics
- Vegetation and Fire and Fuels Management
- Visual
- Cultural Resources
- Minerals (Arizona Strip FO only)
- Livestock Grazing
- Recreation
- Special Designations (Arizona Strip FO only)
- Lands and Realty (Arizona Strip FO only)

Alternative A: No Action

Impacts from Travel Management

Archaeological and Historical Resources: Impacts to cultural resources primarily stem from management actions that restrict or increase access. Increased access to cultural sites could increase contact by visitors who could intentionally damage sites by collecting surface artifacts, vandalizing, illegally digging, or otherwise excavating the sites. Visitors can also unintentionally damage sites by camping or driving across them. In fact, studies have shown that damage to sites is mainly concentrated within several hundred yards of roads (Sullivan et al. 2002). Reducing such access by closing roads or restricting travel could thus protect cultural resources (Bungart and Raney 2006). On the other hand, increased access can allow for the increased presence of law enforcement, cultural resource personnel, and site stewards for purposes of monitoring sites and areas. Increasing access could also increase the amount of cultural resource inventories and research as it would decrease the cost of excavation, inventory, or recording. Finally, increased access would allow for the increased presence of the public, which can also deter vandalism. This is suggested by recent Archaeological Resources Protection Act (ARPA) cases in the Arizona Strip and in southern Utah showing that pothunters in the area tend to select isolated sites in order to excavate without getting caught. As a result, more and more pothunters in the area are using OHVs or 4-wheel drive vehicles to access and vandalize sites in roadless areas.

Under Alternative A, motor vehicles would be restricted to designated roads and no areas of the Monuments would be authorized for cross-country, off-road vehicle use, except for authorized administrative and emergency purposes. This would limit direct and indirect impacts associated with motorized vehicle use on or near sites. This alternative designates the most miles of routes open to motorized/mechanized use by the public over any other alternative resulting in moderate impacts to cultural resources. This would allow continued access for vandalism of cultural resources and for continued monitoring of the area to stop such damage. It would also provide access for researchers.

Implementation of travel management decisions under Alternative A would contribute to cultural resource protection by prohibiting additional proliferation of roads by individuals within the Planning Area, which would help protect archaeological and historical sites. Development of a transportation plan in the Monuments would also enhance cultural site access for visitation, research, and protection. Overall impacts to archaeological and historical resources would be moderate.

Resources of importance to American Indians: Alternative A would provide the most motorized access to TCPs by American Indians. It would also allow for continued access, damage, and vandalism to TCPs of American Indians and archaeological sites by other visitors using motorized and mechanized vehicles. Impacts would range from negligible to minor.

Impacts from Wilderness Characteristics

No areas would be identified for wilderness characteristics under Alternative A.

Impacts from Vegetation and Fire and Fuels Management

Archaeological and Historical Resources: Restoration activities would continue to be implemented and would affect archaeological and historical resources. In particular, restoration of Great Basin, Ponderosa Pine, and Riparian ecological zones could directly affect archaeological and historical resources. Eradication of noxious weeds may involve surface disturbance, which would impact archaeological and historical sites. Sites eligible for listing on the NRHP in these areas would continue to be avoided by any surface disturbing activity and a buffer of 40 meters would continue to be established around village sites, as requested by the Tribes. Mitigation of some impacts would be provided by following Section 106 procedures.

Prescribed fires would continue to be allowed across sites not vulnerable to destruction by fire, such as areas that have already burned many times in the past. Areas excluded from fire treatment would be rock art, wooden structures or features, and any area vulnerable to the indirect effects of subsequent erosion. Fire suppression activities may require use of heavy equipment that can directly impact archaeological and historical resources through surface disturbance. Wildland fires may destroy or alter archaeological and historical sites susceptible to damage from fire, heat, or smoke. Fire suppression activities overall would help to stop wildland fire and ultimately protect archaeological and historical resources that might be destroyed or damaged by fire. Therefore, impacts from all vegetation management, including fire and fuels management, would be minor to moderate, considerably less in intense to wildland fires that would destroy wooden features and structures and damage rock art and surface features.

Vegetation treatments would have indirect impacts on cultural resources from increased erosion and displacement and destruction of surface artifacts and, in some cases, destruction of surface and buried structures and features. Overall impacts from vegetation management would result in direct and indirect impacts to archaeological and historical resources, which could be partially

mitigated during compliance with NEPA and Section 106 of the NHPA. Projects would be redesigned to avoid historic properties or those eligible for or listed on the NRHP, thus mitigating some of the direct and indirect impacts.

In Vermilion, there have been minimal vegetation treatments projects in the past because fuel loads are generally low, reducing the chance of catastrophic fire. As a result, any treatments to reduce fuel load in the Monument would be small scale and localized, resulting in negligible to minor impacts, depending on site-specific projects. Riparian invasive and exotic species removal could occur in some riparian areas and may directly impact archaeological and historical resources. However, treatment efforts would help to stop root damage and erosion of deposits and structures from invasive species and help to keep archaeological and historical resources intact. Mitigation associated with compliance with NEPA and NHPA would help to redesign projects so that sites are avoided or measures are taken to protect these resources.

Resources of importance to American Indians: The above impacts to cultural and archaeological resources would also apply to resources of importance to American Indians, with the addition that restoration, including fire and fuels management, could increase some native vegetation important to American Indians. For example, during the Mt. Trumbull restoration efforts in the mid-1990s, large amounts of native tobacco grew in the treatment areas in the years following restoration and subsequent fire treatments where it had not occurred before treatment. Historically, American Indians burned areas in the Arizona Strip prior to Euro-Americans arrival to encourage growth of native plants, as well as for other reasons. Restoration efforts benefit some types of native vegetation and provide additional locations for American Indians to collect such vegetation. Impacts from all vegetation treatments, including fire and fuels management, on resources of importance to American Indians would be moderate. Traditional uses of and access to resources would continue and would be sustainable.

Impacts from Visual Resources

Archaeological and Historical Resources: VRM classes I and II categories would help protect cultural resource sites and landscapes from visual intrusions and surface disturbance on 42 percent of Parashant, 100 percent of Vermilion, and 33 percent of the Arizona Strip FO under Alternative A; however, such categories could also limit research excavations. Major modifications to the visual landscape could be allowed in VRM Class IV areas on 26 percent of the Monuments and almost half (47 percent) of the Arizona Strip FO. Maintenance and/or enhancement of night sky conditions at the local level would protect historic and prehistoric landscapes. Impacts would be minor.

Resources of importance to American Indians: The above impacts would also apply to TCPs and landscapes associated with them.

Impacts from Cultural Resources

Archaeological and Historical Resources: Maintaining the designated Public Use Sites in all three planning areas would provide opportunities to educate the public about past activities on the Monument and allow for public enjoyment of these resources. However, designated Public Use sites could also lead to damage and vandalism at the sites or sites near them.

Cultural inventories, documentation, research, protective measures, monitoring, and site steward patrols would continue to provide information about the past in the Planning Area and to protect cultural resource sites. The impact to archaeological and historical sites would be minor.

Resources of importance to American Indians: Continuing to interpret and direct the public to Public Use Sites could lead to damage and vandalism to resources of importance to American Indians at these areas. Opportunities also would be available to interpret and explain past and current American Indian uses of the resources and areas near these public use sites from an American Indian perspective. Interpreting sites could also help foster conservation ethics by educating visitors about these resource values. However, the presence of the general public at some of these sites may deter American Indian visits and activities. Impacts would be moderate and site specific.

Impacts from Minerals (Arizona Strip FO only)

Archaeological and Historical Resources: Most of the Arizona Strip FO would be open to mineral exploration and development. Direct impacts to archaeological and historical resources from associated ground disturbance would be moderate.

Indirect impacts could also occur from unauthorized collection of artifacts by mine workers at archaeological sites near uranium mines. Impacts would be site specific and could be major, resulting in loss of information on local and regional history and prehistory.

Under Alternative A, approximately 10 percent of the Arizona Strip FO would be closed to mineral material disposals and thus protected from related impacts. Mineral material disposals would continue to be allowed in most ACECs, thus potentially impacting significant archaeological and historical resources. Impacts would be mitigated by following Section 106 procedures.

Resources of importance to American Indians: The above impacts for archaeological and historical resources would also apply to resources of importance to American Indians, with the addition that mining activities could disrupt access to TCPs and the additional noise and disturbance associated with active mining sites could disturb some activities at nearby TCPs. Impacts would site specific. Section 106 procedures may reduce some impacts.

Impacts from Livestock Grazing

Archaeological and Historical Resources: Compaction of soil, increased erosion, and displacement of artifacts associated with livestock grazing would continue under Alternative A. Impacts to archaeological and historic resources would be minor, but more widespread compared to the other alternatives due to more lands being open to grazing.

Resources of importance to American Indians: The above impacts for archaeological and historic resources would apply to resources of importance to American Indians.

Impacts from Recreation

Archaeological and Historical Resources: Recreation use in the Planning Area would increase due to an increase in regional population, as well as new interest in the area due to the designation of the Monuments. Collection and vandalism to archaeological and historical sites by visitors is also expected to increase. Some sites would be monitored, as applicable, deterring adverse impacts from visitors. A substantial portion of monitoring would continue to be conducted by site stewards, who would assist in providing information to apprehend vandals. Law enforcement personnel would continue to be used to detect and deter looters and vandals. Educational efforts would continue to encourage protection of cultural resources and generate an appreciation of the values being protected. The impact would be detectable but slight and localized within small areas.

More public land users and more intense recreational use on Arizona Strip FO lands near the communities would result in more direct and indirect impacts to archaeological and historical resources than in the Monuments. Impacts in some-specific areas near communities or on some types of archaeological sites, such as caves, rock shelters, or rock art, could be moderate or major for specific targeted sites.

Visitors conducting activities under SRPs or outfitters and guides permits would be educated about the provisions of the ARPA and Native American Grave Protection and Repatriation Act (NAGPRA), which would help protect archaeological and historical sites. Establishment of visitor limits, supplemental rules, or restrictions based on various strategies, including carrying capacity or limits of acceptable change (LAC), on a case-by-case basis could protect archaeological and historical sites.

Resources of importance to American Indians: The above impacts for archaeological and historical resources would also apply to resources of importance to American Indians, with the exception that additional recreational use could interfere with traditional uses in some areas. Impacts would be moderate.

Impacts from Special Designations

Archaeological and Historical Resources: Maintaining the two existing ACECs in Parashant and five ACECs in the Arizona Strip FO that were designated to protect archaeological and historical sites would continue to provide such protection. The protection measures provided by ACEC designations would be more important in the Arizona Strip FO compared to Parashant, as Monument designation, alone, would provide similar or higher forms of protection in the latter.

Resources of importance to American Indians: The above impacts for archaeological and historical resources would also apply to resources of importance to American Indians.

Impacts from Lands and Realty

Archaeological and Historical Resources: Land disposals would impact archaeological and historical resources because the disposed lands and associated resources would lose the protection provided by federal laws. Impacts would be direct, long term, and minor to major, depending on the location of the lands to be disposed and the nature of the cultural resources on them. Land use authorizations such as ROWs, permits, or leases would cause direct and indirect long term impacts to archaeological and historical resources and would be mitigated under NEPA and Section 106 of NHPA. Overall impacts from lands and realty would be site specific and moderate.

Resources of importance to American Indians: The above impacts to archaeological and historical resources from land use authorizations and land disposals would also apply to resources of importance to American Indians.

Alternative B

Impacts from Travel Management

Archaeological and Historical Resources: In the Monuments under Alternative B, roughly one third the miles of motorized and mechanized routes would be open to the public compared to Alternative A. This would be the least among all the alternatives. In addition, the most miles of roads would be closed under this alternative. Compared to Alternative A, these route designations would result in a decrease of unintentional impacts such as driving or camping on or near sites. On the other hand, fewer open routes under Alternative B may increase vandalism because of reduced areas receiving public and agency monitoring, thus shielding illegal activity from public view. In addition, scientific research would be more expensive under this alternative than under any other because of the challenge of access. Overall impacts to archaeological and historical resources would be moderate.

In the Arizona Strip FO, impacts would be similar to impacts discussed under Alternative A because most of the routes for the Arizona Strip FO remain to be inventoried, evaluated, and

designated after this FEIS is complete. Impacts from travel on archaeological and historical resources would thus continue to be moderate.

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

Impacts from Wilderness Characteristics

Archaeological and Historical Resources: The most acres to maintain wilderness characteristics in the Monuments would occur under Alternative B, resulting in the greatest potential for excluding motorized and mechanized access and any associated vandalism or damage. This would increase protection of archaeological and historical resources from impacts associated with vehicular travel, but could also increase opportunities for vandalism due to reduced agency and public monitoring. Impacts would be moderate.

In the Arizona Strip FO, impacts would be similar to those discussed under Alternative B for the Monuments, except that not as many acres would be allocated under this alternative as under Alternative C. Impacts would be minor.

Resources of importance to American Indians: Impacts would be similar to those described for archaeological and historic resources because the areas identified with wilderness characteristics would also protect American Indian TCPs while, at the same time, make it harder for American Indians to access such resources. The impacts would be moderate in the Monuments and minor in the Arizona Strip FO.

Impacts from Vegetation and Fire and Fuels Management

Archaeological and Historical Resources: Alternative B proposes the least amount of acreage for vegetation treatment projects among the alternatives, which would result in the least potential for damage to archaeological and historical resources from such projects. Impacts would be minor.

Having no planned vegetation treatments in the Riparian and Ponderosa Pine ecological zones under Alternative B would benefit archaeological and historical sites within these zones. All other vegetation treatment projects under this alternative, particularly those in the Great Basin Ecological Zone, would have a minor impact because such projects would have site-specific review under NEPA, which could require project redesign to avoid or mitigate historic properties, or those eligible for or listed on the NRHP.

In Parashant, restoration of Pakoon Springs would result in moderate impacts to archaeological and historical resources, even though the emphasis would be on natural processes. Some impacts could be mitigated and the project would comply with Section 106 of NHPA.

Resources of importance to American Indians: The types of impacts would be the same as described above for archaeological and historical resources.

Impacts from Visual Resources

Archaeological and Historical Resources: VRM classes I and II would help to protect cultural resource sites and landscapes from visual intrusions and surface disturbance on nearly all acres of the Monuments under Alternative B, which is the most area covered among the alternatives; however, this could also limit research excavations. Maintenance and/or enhancement of night sky conditions at the local level would protect historic and prehistoric landscapes. Impacts would be minor.

VRM classes I and II would protect cultural resource sites and landscapes from visual intrusions and surface disturbance on approximately one third of the Arizona Strip FO under Alternative B, which represents fewer acres of protection compared to Alternative A, but more when compared to the other Alternatives. Impacts would be minor.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historical resources as the protected areas under VRM classes I and II would also include American Indian TCPs and important landscapes. Impacts would be moderate.

Impacts from Cultural Resources

Archaeological and Historical Resources: Four additional public use sites in Parashant, three new sites in Vermilion, and one additional site in the Arizona Strip FO would increase the interpretive/educational opportunities throughout the Planning Area. Impacts from the remaining actions and allowable uses would be the same as described under Alternative A and remain minor.

Resources of importance to American Indians: Impacts would be the similar as those described above for archaeological and historic resources. More public use sites identified under this alternative would provide more opportunities for educating the public, but could also disrupt American Indian activities at or near these sites.

Impacts from Minerals (Arizona Strip FO only)

Archaeological and Historical Resources: Among the alternatives, Alternative B proposes the least amount of acreage to be open and available for mineral exploration and development with

no or minimal restrictions. This action would result in the least amount of surface disturbance and consequential impacts to archaeological and historic resources. Effects would be site specific and moderate for specific archaeological and historical resources.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historic resources.

Impacts from Livestock Grazing

Archaeological and Historical Resources: In Parashant under Alternative B, impacts to cultural resources from livestock grazing would be eliminated in the Pakoon Springs and Tuweep Allotments and the Cane Springs pasture of the Mud and Cane Allotment because they would be unavailable to grazing.

In Vermilion, unavailability of the River Pasture of the Lees Ferry Allotment for livestock grazing would reduce impacts to cultural resources in this area.

Other livestock grazing impacts in the Monuments would continue. These actions would have a minor impact to archaeological and historical resources. In Arizona Strip FO, impacts from livestock grazing would be the same as under Alternative A.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historic resources.

Impacts from Recreation

Impacts would be the same as described under Alternative A for both archaeological and historic resources and resources of importance to American Indians.

Impacts from Special Designations

Archaeological and Historical Resources: The two existing ACECs would not be continued in Parashant under Alternative B, and no new ACECs would be created. Impacts would be negligible as Monument status provides superior protection to that provided under ACEC designation.

In Arizona Strip FO under Alternative B, all the ACECs under Alternative A would remain in place. In addition, the Marble Canyon, Lost Spring, Moonshine Ridge, and Johnson Spring ACECs would increase in size and one new ACEC (Kanab Creek) would be created, which would provide additional protection to archaeological and historical resources in that area. As a result, Alternative B proposes the most acres to be covered by ACEC designation for protection of cultural resources in the Arizona Strip FO among the alternatives. Impacts would be moderate and beneficial.

Resources of importance to American Indians: Impacts would be the same as described under archaeological and historic resources as the ACEC protection would also apply to sites and locations of importance to American Indians, including TCPs.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as described under Alternative A for both archaeological and historic resources and resources of importance to American Indians.

Alternative C

Impacts from Travel Management

Archaeological and Historical Resources: Compared to Alternative A in the Monuments, fewer roads would be open to the public under Alternative C, resulting in more expensive research and fewer opportunities to detect and deter vandalism. Fewer open roads would also decrease access to cultural sites by visitors who could collect artifacts and/or damage sites by camping on them or driving across them. While Alternative C proposes, seven times the miles of routes open for administrative use only compared to Alternative A, use on such roads would be minimal and result in few impacts. Overall impacts would be moderate and less intense as under Alternative B, which proposes even fewer roads open to the public.

In the Arizona Strip FO, impacts from Travel Management would be the same as described under Alternative A.

Resources of importance to American Indians: As discussed above for archaeological and historic resources in the Monuments, Alternative C would limit access compared to Alternative A, which would protect traditional areas and sites from disturbance by visitors, including vandals; however, reduced access would also affect American Indians for collecting resources and using TCPs. Impacts would not be as intense as Alternative B and would be minor.

Impacts from Wilderness Characteristics

Archaeological and Historical Resources: Impacts in the Monuments would be similar to Alternative B, although not as intense as roughly half as many acres would be maintained with wilderness characteristics under Alternative C. Impacts would be minor.

In the Arizona Strip FO, the most acres with wilderness characteristics would occur under Alternative C. Impacts would thus be the same as described Alternative B, but more intense. The impacts would be minor.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historic resources.

Impacts from Vegetation and Fire and Fuels Management

Archaeological and Historical Resources: Impacts would be similar to those described under Alternative B, although more intense as Alternative C proposes more acreage for vegetation restoration, which would result in increased potential for impacts to archaeological and historical resources. Impacts would remain minor because Section 106 procedures would be followed.

In Parashant, restoration of Pakoon Springs would result in more disturbances to surface and subsurface archaeological and historical resources, resulting in moderate impacts. Mitigation measures as a result of Section 106 compliance may reduce impacts.

Resources of importance to American Indians: In Parashant, restoration of Pakoon Springs would result in more surface disturbance to archaeological resources of importance to American Indians resulting in a major impact. Increased acreage for vegetation restoration in the Planning Area would also result in greater impacts to archaeological resources; however, restoration also may increase native vegetation of importance to American Indians. Overall impact would be moderate.

Impacts from Visual Resources

Archaeological and Historical Resources: Under Alternative C, 75 percent of Parashant and 99 percent of Vermilion would be designated VRM classes I and II, which would protect cultural resource sites and landscapes from visual intrusions and surface disturbance, although to a less extent when compared to Alternative B. Also under Alternative C, 24 percent of Parashant and less than one percent of Vermilion would be designated VRM classes III and IV, which would allow some modifications of the existing character of the visual landscape, resulting in minor impacts.

In Arizona Strip FO, impacts would be similar to those described under Alternative A.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historical resources.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B for both archaeological and historic resources and resources of importance to American Indians.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be the same as described under Alternative A for both archaeological and historic resources and resources of importance to American Indians.

Impacts from Livestock Grazing

Impacts would be the same as described under Alternative B for both archaeological and historic resources and resources of importance to American Indians.

Impacts from Recreation

Impacts would be the same as described under Alternative A for both archaeological and historic resources and resources of importance to American Indians.

Impacts from Special Designations

Archaeological and Historical Resources: For Parashant, impacts would be the same as described under Alternative B. For the Arizona Strip FO, roughly 40 percent of the acres would be under ACEC protection compared to Alternative B, which would result in less protection to archaeological and historical resources afforded by ACEC designation. More protection would be offered, however, when compared to Alternative A.

Resources of importance to American Indians: Impacts would be the same as described under archaeological and historic resources as the ACEC protection would also apply to sites and locations of importance to American Indians, including TCPs.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as under Alternative A, except that there would be 131 more acres identified for exchange, sale, or lease. Impacts would remain moderate and mitigated under Section 106 of NHPA.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historical resources.

Alternative D

Impacts from Travel Management

Archaeological and Historical Resources: With the exception of Alternative A, the greatest access for all motorized and mechanized vehicle users, including the OHV community, would be provided under Alternative D, resulting in a moderate impact to archaeological and historical

resources due to potential damage to sites caused by visitors, either intentionally or unintentionally. Access for research would be easier and more cost effective under this alternative than under any other except Alternative A. Monitoring of sites, both privately and federally, would also be more efficient under Alternative D compared to all other alternatives except A.

Resources of importance to American Indians: Impacts would be similar to those above for archaeological and historic resources in the Monuments. Having easier access to various sites in the Planning Area, with the exception of Alternative A, would aid American Indians in collecting resources and using TCPs. Ease of access, however, would also increase the potential for traditional areas and sites to be disturbed by visitors, including vandals. However, that same access affords more opportunities for site stewards, law enforcement personnel, and other BLM personnel to monitor and detect or deter vandalism

Impacts from Wilderness Characteristics

Archaeological and Historical Resources: Alternative D would identify the fewest acres as having wilderness characteristics when compared to the other action alternatives. This would create a greater potential for unintentional and direct impacts to archaeological and historical resources due to increased motorized access. There could also be fewer opportunities for vandalism compared to the other action alternatives as more access would be provided for site stewards, law enforcement, and the general public. Overall impacts would be minor.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historic resources, with the exception that fewer acres allocated to maintain wilderness characteristic would increase motorized access to American Indians for traditional uses. Impacts would be minor.

Impacts from Vegetation and Fire and Fuels Management

Archaeological and Historical Resources: Impacts would be the same as described under Alternative C, with the exception that more acres are proposed for vegetation treatment in the Great Basin and Ponderosa Pine ecological zones under Alternative D. This would result in more widespread impacts to archaeological and historical resources. Impacts would be minor to moderate even though NEPA and NHPA mitigation would occur prior to project implementation.

Resources of importance to American Indians: Impacts would be the same as described for archaeological and historical resources. Larger acreages proposed for vegetation treatment would have greater surface disturbance resulting in more impacts to archaeological sites and TCPs considered important to American Indians. The same vegetation treatments could also provide more opportunities for native vegetation to prosper, such as native tobacco. Impacts would be moderate.

Impacts from Visual Resources

Archaeological and Historical Resources: In Parashant and Vermilion, the fewest acres under any alternative other than Alternative A are proposed for VRM classes I and II under Alternative D. This means that the visual integrity of historic and archaeological landscapes and resources in the Monuments would not be protected as much as under other alternatives. Impacts would be moderate.

In Arizona Strip FO, about one-eighth of the planning area would be managed under VRM classes I and II. This would protect archaeological and historical sites and their contexts over a larger area than under Alternative A, but not as much as under Alternatives B and C. Impacts would be minor.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historical resources.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B for both archaeological and historical resources and resources of importance to American Indians.

Impacts from Minerals (Arizona Strip FO only)

Archaeological and Historical Resources: Impacts would be the same as described under Alternative A, except that there would be an increase in the amount of acreage open for mineral development with the least restrictions. Impacts from mineral exploration or development would be moderate because, even after mitigation, some residual cultural resource values would be lost.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historical resources, with the addition that access to TCPs could be affected. In addition, noise and disturbance from active mining sites could affect some site-specific uses at TCPs. Impacts would be moderate, with some major impacts in site-specific areas.

Impacts from Livestock Grazing

Impacts would be the same as described under as Alternative A for both archaeological and historical resources and resources of importance to American Indians.

Impacts from Recreation

Impacts would be the same as described under Alternative A for both archaeological and historical resources and resources of importance to American Indians.

Impacts from Special Designations

Archaeological and Historical Resources: Impacts in Parashant would be the same as described under Alternative B. In the Arizona Strip FO, Alternative D proposes the least amount of acres among the alternatives that would be under ACEC designation protecting cultural resources. Impacts would be moderate.

Resources of importance to American Indians: Impacts would be the same as described above for archaeological and historical resources.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as described under Alternative C for both archaeological and historical resources and resources of importance to American Indians.

Alternative E: Proposed Plan

Impacts from Travel Management

Archaeological and Historical Resources: The types of impacts would be the same as described under Alternative A. In the Monuments, the magnitude of impacts would be greater than under Alternatives B and C but less than under Alternatives A and D due to the miles of routes open to the public. Overall impacts would be moderate.

Resources of importance to American Indians: Impacts would be similar to those described above for archaeological and historical resources.

Impacts from Wilderness Characteristics

Archaeological and Historical Resources: In the Monuments, site damage resulting from motorized access due to the number of acres managed for wilderness characteristics would be more likely under Alternative E than under Alternatives B and C, and less likely when compared to Alternative D. However, there would also be less potential under this alternative than under Alternatives B and C and more than under Alternative D for vandalism of sites away from monitoring by law enforcement, site stewards, and BLM and NPS staff.

In the Arizona Strip FO, impacts would be similar to those described under Alternative D.

Resources of importance to American Indians: Impacts would be similar to those described above for archaeological and historical resources.

Impacts from Vegetation and Fire and Fuels Management

Archaeological and Historical Resources: Overall impacts would be the similar to those described under Alternatives C or D due to similar acres being proposed for treatment, depending upon ecological zone.

In Parashant, restoration and facilities proposed for Pakoon Springs could impact archaeological and historical resources more than under any other alternative. Protective barriers to protect resources would help to stop damage to these resources. Development of interpretive trails and facilities at Cane Springs could also impact archaeological and historical resources. The opportunities for environmental education at both Pakoon and Cane springs would enhance the understanding, appreciation, and protection of archaeological and historical resources at these sites as well as the Mojave Desert and Great Basin regions. Impacts would be moderate.

Resources of importance to American Indians: Impacts would be the same as described under Alternative D

Impacts from Visual Resources

Impacts would be the same as described under Alternative B in the Monuments and the same as Alternative D in the Arizona Strip FO for both archaeological and historical resources and resources of importance to American Indians.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B for both archaeological and historical resources and resources of importance to American Indians, with the exception that there would be fewer acres under ACEC protection in the Arizona Strip FO.

Impacts from Minerals (Arizona Strip FO only)

Archaeological and Historical Resources: Impacts would be the same as described under Alternative A. Impacts would be slightly less intense as there would be more acres available with restrictions, although this amount would be less than that proposed under Alternative D. Impacts would be moderate.

Resources of importance to American Indians: Impacts would be the same as described under Alternative D.

Impacts from Livestock Grazing

Impacts would be the same as described under Alternative A for both archaeological and historical resources and resources of importance to American Indians.

Impacts from Recreation

Impacts would be the same as described under Alternative D for archaeological and historical resources. Impacts would be the same as described under Alternative A for resources of importance to American Indians.

Impacts from Special Designations

Archaeological and Historical Resources: The types of impacts would be similar to those described under Alternative A, although more widespread as more acres would be under ACEC protection for archaeological and historical resources. Alternative E also proposes more ACEC acres compared to Alternatives C and D, but considerably fewer acres compared to Alternative B.

Resources of importance to American Indians: Impacts would the same as discussed above for archaeological and historical resources.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as described under Alternatives C for both archaeological and historical resources and resources of importance to American Indians.

Cumulative Impacts

Archaeological and Historical Resources: The increase in regional population and popularity of the Monuments is correlated to an increase in damage to archaeological and historical resources from visitation, including that caused by vandalism. Vegetation treatments, mineral development, disposal of public lands, land use authorizations, and livestock grazing would continue to impact archaeological and historical resources. Conversely, creation of the National Monuments on the Arizona Strip and additional wilderness areas west of the Planning Area in Nevada, as well as additional public awareness of the potential irretrievable loss of open spaces and cultural resources, may provide additional protection and more funding to conduct research and preserve archaeological and historical sites in the region.

Proposed actions by the Washington County Water Conservancy District such as the Lake Powell Pipeline or the proposed flood control reservoir at Ft. Pearce would also cause direct and indirect long term impacts to archaeological and historical resources. Other actions proposed by local communities under R&PP leases/conveyances could also impact archaeological and

historical resources. However, these impacts could be mitigated under Section 106 of the NHPA.

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

VISUAL RESOURCES

This section presents potential impacts of the alternatives on visual resources, specifically the potential for various management scenarios to create visual changes or contrasts, given the desired visual resource objectives proposed for each alternative. Additionally, the potential impacts of alternatives that may increase sources of artificial light at night; reduce the scenic quality ratings, as seen from high sensitivity foreground or middle ground viewpoints; block or disrupt existing views; or reduce public opportunities to view scenic resources are presented.

Methods and Assumptions

To the extent practical, spatial data was used to compare the proposed management of each alternative to the VRM classes (objectives). In the case of VRM class designations, evaluations were made against the current condition of visual resources. Current conditions were identified though a recent updated visual inventory of the Planning Area, which was used to assign visual resource inventory (VRI) classes to existing visual resources. Impacts from VRM class designations proposed under all of the alternatives, including Alternative A, are measured against VRI classes. Impacts would be expected in situations where VRM class designations differ from VRI classes identified. Figures 4.1 – 4.12 are used to illustrate the discrepancies.
Various actions that might create changes to the basic landscape elements of form, line, color, and texture were considered in the estimation of impacts. In addition, viewing time-of-day, season, and duration were considered, where possible. Potential impacts to scenic quality were estimated by evaluating the potential for management actions to noticeably change one or more of the seven factors (landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications) evaluated during the inventory. The results of analysis describe the potential for reduction, maintenance, or enhancement of overall baseline visual settings for each alternative.

Effects are quantified where possible. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: The impact would not be detectable. The effect on visual resources, or the ability to access and/or enjoy them, would be at the lowest levels of detection, barely measurable with any perceptible consequences, either beneficial or adverse, on visual resources.

Minor: The impact would be detectable. The effect on visual resources, or the ability to access and/or enjoy them, would be measurable or perceptible, but it would be slight and localized within a relatively small area. The action would not permanently affect visual character or diminish quality features.

Moderate: The impact would be readily apparent. The adverse impact would be measurable and perceptible. The beneficial impact would be readily apparent. The action would change one or more character-defining features or opportunities of the visual resource, but it would not diminish the integrity of the resource to the extent that it would be permanently jeopardized.

Major: The impact would be severe. The adverse impact on visual resources, or the ability to access and/or enjoy them, would be substantial, noticeable, and permanent. Conversely, the beneficial impact would be a substantial improvement to existing contrast, scenic quality, or generate important new viewing opportunities. The action would change one or more character defining features of the resource, diminishing or improving the integrity of the resource to the extent that it would be permanently changed.

The following assumptions regarding the future management of visual resources are made:

- All laws for the management and protection of visual resources would be followed, to the extent allowed by the budget and available personnel.
- Any new surface disturbing activities proposed would be subject to NEPA analysis, including a VRM contrast rating.
- Activities proposed that would not initially meet VRM objectives for the area would be mitigated to the extent needed to meet the objectives. Those activities proposed that could not be mitigated would not be authorized.
- Some proactive restoration of areas that do not meet desired visual resource objectives may be completed each year.
- VRI classes are informational in nature and provide the basis for considering visual values in the RMP process. VRM classes (I, II, III, and IV) are designated through the land use planning process, and the designation of VRM classes is based on management decisions made in RMPs.
- All actions proposed during the RMP process must consider the importance of the visual values and the effects the project may have on these values.

Impacts to Visual Resources

Impacts to Visual Resources would result from actions proposed under the following resource management programs:

- Travel Management
- Wilderness Characteristics
- Vegetation and Fire and Fuels Management
- Soil, Water, and Air
- Fish and Wildlife
- Special Status Species
- Visual Resources
- Cultural Resources
- Special Designations (Wilderness)
- Livestock Grazing
- Lands and Realty
- Recreation and Visitor Services

Alternative A: No Action

Impacts from Travel Management

Under Alternative A, Travel Management Areas (TMAs) would not be identified. Keeping wilderness and some other sensitive areas closed to motorized and mechanized vehicle use would protect visual resources and non-motorized viewing opportunities on 285,268 acres in Parashant, 89,828 acres in Vermilion, and 123,100 acres in the Arizona Strip FO. Impacts would be indirect and long term. Managing Parashant's 1,715 miles, Vermilion's 446 miles, and Arizona Strip FO's 4,934 miles of existing open routes as designated open routes would continue to influence the landscape. Travel on these routes would continue to produce intermittent dust, causing indirect, short-term, negligible to moderate visual contrasts with the landscape. The visual impact of 71 miles of existing closed routes in Parashant, 105 miles in Vermilion, and 3 miles in the Ferry Swale area of the Arizona Strip FO, all of which are mainly within wilderness areas, would continue to diminish, either by direct active reclamation actions or by indirect natural processes. Additionally, actions such as rerouting certain alignments, monitoring the creation of unauthorized routes and obscuring/rehabilitating those found, and active and/or passive natural reclamation of any temporary routes would enhance visual resources by reducing visual contrasts on a localized, long-term basis. Active reclamation of routes would reduce contrast more quickly in the short-term.

Employing a designated Travel Management system of existing routes would indirectly ensure that the public would continue to have the opportunity to view scenic resources over the long-term. No travel management actions under Alternative A would block or disrupt views as seen from a variety of popular viewing locations. Restricting travel to designated routes would reduce

the potential for creation of new impacts outside those routes. Impacts would be long term and range from negligible to minor. Constraining road maintenance to within the existing disturbed travel surface areas would reduce the potential for increasing the impacts of designated routes. Impacts would be direct, localized, short or long term, and range from minor to moderate. The continued use of existing material sites on BLM lands for road maintenance would affect visual resources over the long term on a localized basis. New material sites would result in negligible to moderate impacts, depending on pit location as viewed from key observation points, quantity of material to be removed, and compatibility of subsurface/surface soil color.

Vehicles traveling along roads, aircraft landing and/or overhead, and nighttime road-related construction and/or maintenance work are the only significant sources of transportation-related artificial light at night that could be seen in the Planning Area. Impacts to night sky would generally be short-term, localized, and negligible. However, in the case of major, nighttime roadwork using high power artificial lighting, impacts to night sky conditions could be moderate, though short-term and localized.

Impacts from Wilderness Characteristics

No areas with wilderness characteristics are proposed under Alternative A.

Impacts from Vegetation and Fire and Fuels Management

Over the long term, restoration and vegetative treatments designed to improve ecological conditions could indirectly enhance visual resources on a localized basis. However, in the short-term, methods used to achieve improved ecological conditions could directly create visual changes to landscape form, line, color, and texture. Such impacts would range from minor to moderate, depending on scope and magnitude of treatment and the methods used. Chemical and biological methods would tend to gradually create visual contrasts that mimic natural ecological change, whereas fire and mechanical methods would create such contrasts more suddenly and noticeably. Depending on the VRM class where a particular treatment is conducted, impacts to the landscape could either meet or not meet the visual objective for the class. For example, treatments that create moderate change in VRM Class III areas would likely meet the visual standard, whereas moderate change that attracts attention in a VRM Class I or II area would not. Under Alternative A, the amount of acreage that could be treated in each ecological zone would not be limited; theoretically and with sufficient funds, widespread landscape change could occur if all acres needing treatment in the Planning Area were treated. Under this extreme, impacts would be major, although this scenario is very unlikely. The possibility of localized, moderate to major impacts would be reduced by prohibiting chaining and other methods that cause substantial surface disturbances resulting in visual landscape changes in VRM Class I and II areas. Depending on location, the application of seasonal restrictions, temporary reductions, or elimination of other authorized activities in some vegetation treatment areas could directly reduce opportunities for the public to view some scenic resources. Ongoing cleanup of the

abandoned equipment and materials at Pakoon Springs would indirectly improve visual quality in the area over the long term.

Under the current wilderness management plan, within the Mt. Trumbull Wilderness, wildland fire would be the only treatment method considered for the ponderosa pine atop Mt. Trumbull forest, which has the potential for minor impacts to visual resources in that area. Large fire management camps using artificial lighting could directly affect night sky conditions on a localized, short-term basis. The ongoing application of minimum impact suppression tactics and minimum tool policy for fire operations in wilderness and NPS-proposed wilderness areas would indirectly contribute to maintaining landscape character in these areas.

Impacts to visual resources from prevention and mitigation programs aimed at reducing unwanted ignitions in wildland fire use and non-wildland fire use areas would be similar to those described above for vegetative treatments. However, actions related to prevention could reduce human-caused ignitions and related visual impacts caused by fire. Impacts would range from minor to moderate. Post fire rehabilitation methods, such as seed drilling, mulching, netting, or hydroseeding, could directly result in localized visual contrasts. Impacts would be minor to moderate in the short term, but become negligible in the long term. Wildland fires and prescribed fires would result in smoke, causing short-term minor to moderate impacts on visual resources, including the night sky. Such fires would also affect visual resources due to increased vehicle traffic, fire lines, and the contrast between burned and unburned areas. The latter could vary in size from a few acres to tens of thousands of acres.

Noxious weeds could affect visual resources to a minor degree by replacing native vegetation and creating changes in existing landscape form, color, or texture. Attempts to control or eliminate noxious weeds would reduce such impacts. This impact would not apply to areas along the Paria River as no removal efforts would be applied to this area. In Parashant and Arizona Strip FO, visual impacts created by the localized, small-scale collection or use of vegetative materials would be negligible; however, any vegetation removal associated with larger-scale research or restoration efforts could produce impacts similar to those described above for mechanical vegetative treatments. This impact would not apply to Vermilion as the Monument would be closed to the sale of vegetative products.

Impacts from Soil, Water, and Air

Soil: Placing restrictions and guidelines on surface disturbing and reclamation activities in all three planning areas under Alternative A, and requiring the removal of facilities or improvements no longer necessary and reclaiming such sites, would mitigate visual contrasts created by a variety of resource management projects. Impacts would be localized, both short and long term, and range from moderate to major. Actions to improve riparian and watershed condition in areas of moderate to severe erosion would affect visual resources in a manner similar to those described under Impacts from Vegetation and Fire and Fuels Management.

Water: Over the long term, avoiding floodplain occupancy and development in all three planning areas would moderately reduce the potential for creating localized visual contrasts in the existing landscape. However, it would also reduce the possibility for developing recreation sites that could enhance the public's opportunity to view scenic, riparian resources.

Air: Requiring the mitigation of impacts from fugitive dust during surface disturbing projects would help maintain visual resource conditions.

Impacts from Fish and Wildlife

Under Alternative A, existing public access for hunting and wildlife viewing opportunities would be preserved. Maintaining the Mt. Trumbull Watchable Wildlife Area in Parashant would continue to attract visitors for the purpose of viewing wildlife in their natural settings. Rudimentary facilities could be developed in this Watchable Wildlife area and result in localized, long-term impacts to visual resources ranging from negligible to minor. No impacts from Watchable Wildlife areas would occur in Vermilion or the Arizona Strip FO as no such areas would be maintained.

Restoring native wildlife populations could result in larger wildlife populations that may occasionally over-utilize vegetation on a localized, short-term basis, creating a visual contrast that would be negligible to minor. Constructing and/or modifying of wildlife water developments would create visual contrasts with surrounding landscapes. Impacts would be localized and long-term and range from minor to moderate, depending on the placement, design, and use of native materials and the area's VRM class designation. Placing a priority on maintaining existing facilities over constructing new facilities would reduce the potential for affecting visual resources at new sites. Impacts would be long term and localized, and range from minor to moderate. Limiting fence construction in pronghorn habitat would cause a minor reduction in the potential for new impacts to visual resources.

Impacts from Special Status Species

The protective management prescribed for special status species (including those relating to riparian habitats, ACECs, and non-ACEC habitats) would generally complement the maintenance of landscape character and the conservation of visual resources. Restoration measures that involve surface- or vegetation-disturbing components, however, would create noticeable contrast or reduce scenic quality ratings. Such impacts would be direct and short term, and could range from minor to moderate, depending on the type of treatment/restoration and the amount of change that it would cause to existing landscape form, line, color, or texture. Reducing or restricting public access in special status species habitats could reduce public opportunities to view some scenic resources. Impacts would be direct and long term, and could range from negligible to moderate, depending on the type and location of the restriction and its overlap with known scenic viewing locations.

Impacts from Visual Resources

Under Alternative A, designated wilderness areas would continue to be designated VRM Class I, which would provide long-term maintenance of existing landscape character and viewing opportunities. Any future wilderness or wild and scenic river designations made by Congress would result, by policy, in the affected lands being automatically designated VRM Class I. This would represent a shift from existing combinations of Class II, III, and IV areas to the highest visual management standard, preserving existing landscape character.

Use of the VRM contrast rating process would continue to provide site-specific visual analysis of proposed surface-disturbing activities to ensure that such projects meet visual objectives in project areas through design features and/or mitigation. Both short-term and long-term, indirect effects would accrue over the life of the Plan as management practices are constrained by the contrast rating process to sustain or enhance visual landscapes. Research design proposals would be required to mitigate impacts to scenic quality and conform to the designated VRM class objectives. Under Alternative A, actions to restore natural conditions or appearance in areas already modified may succeed on a localized basis, reducing some visual contrast in the long term.

Under Alternative A, no special provisions would be made to manage, reduce, or preclude actions or facilities that contribute to unnatural night sky conditions. In the long term, this could result in the production of artificial light sources that could affect night skies.

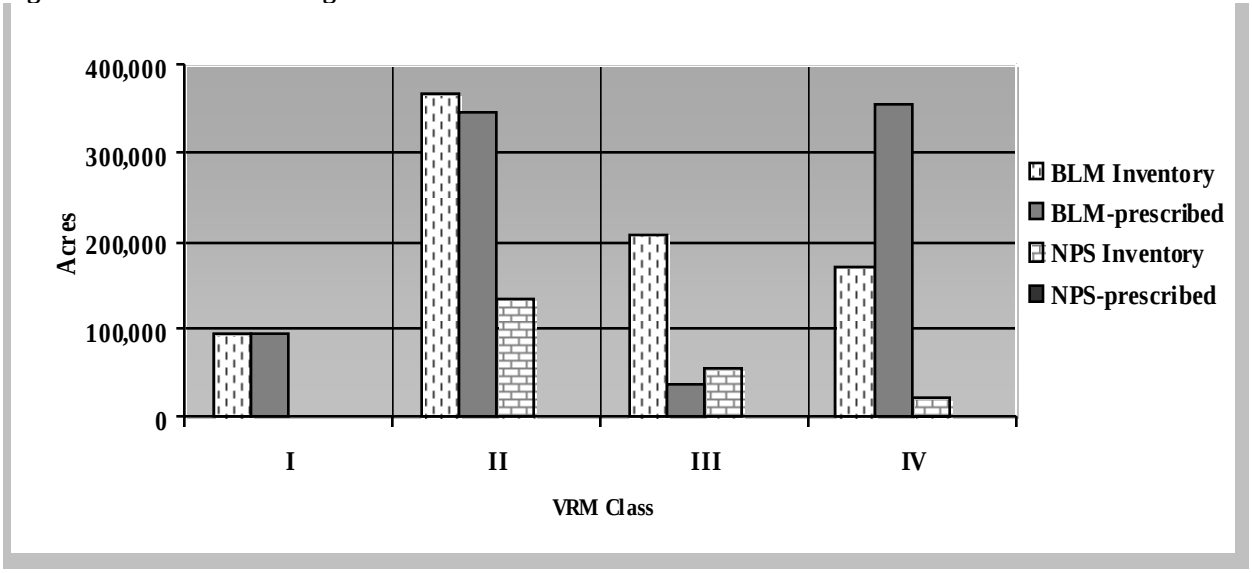
Under Alternative A, current VRM classes in all three planning areas as assigned to BLM lands in the 1992 Arizona Strip RMP would continue. NPS lands in Parashant would remain unassigned. However, in the long term, NPS wilderness management practices would indirectly continue to maintain inherent visual values on the majority of the NPS portion of the Monument. Specific impacts to each of the three planning areas relating to specific VRM class designations are presented below:

Parashant: In the Mt. Trumbull and Parashant RCAs, visual resources would receive a minor commitment of lands with Class III and IV values to a more protective Class II management standard, which would retain the existing character of the landscapes and, generally, allow natural processes to be major agent of change to existing landscapes. Over time, landscapes in Parashant would appear more natural as the signs of management activities become less obvious. The overall commitment to a Class II visual standard on BLM lands under Alternative A would be about 5 percent less than the revised inventory determined to be present (see Figure 4.1).

Under Alternative A's VRM class designation, 81 percent of lands with Class III inventory values in the Pakoon Basin, Poverty Mountain, and southern Shivwits Plateau and 5 percent of lands with Class II inventory values in the Hobble Canyon, Tweed Points, Jump Canyon and Hidden Hills, would primarily be managed under Class IV visual standard. The long-term, indirect result could involve major visual changes allowed to the landscape on up to 339,897

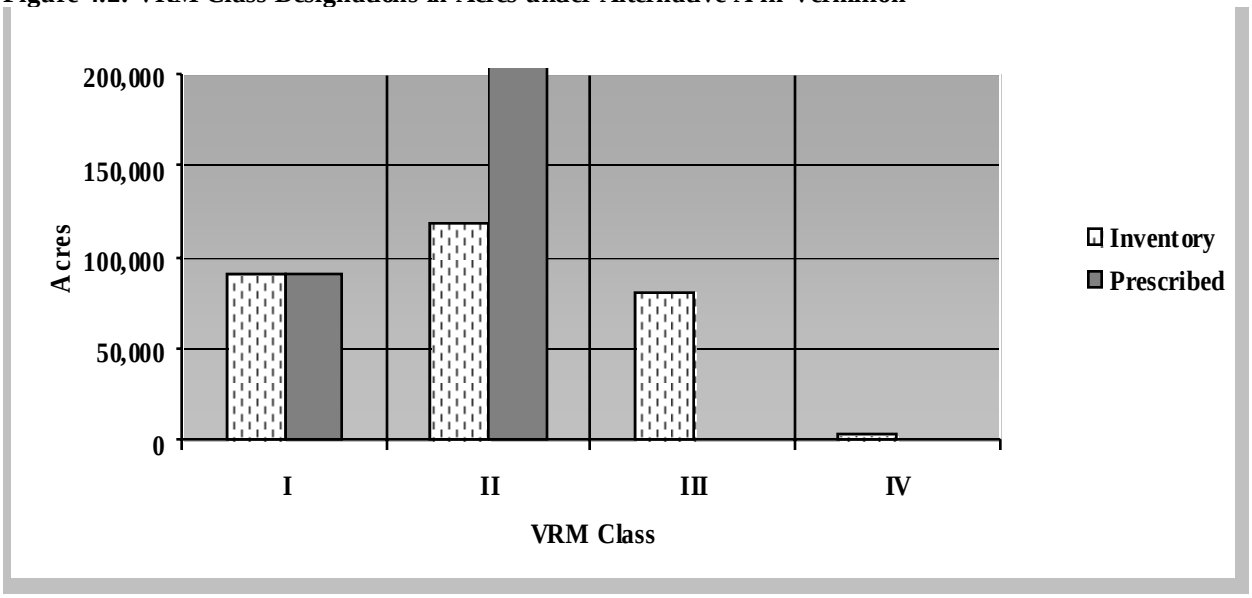
acres, which is 108 percent more than current VRI conditions indicate are present for Class IV values (see Figure 4.1). Impacts could increase by potentially allowing more activities resulting in major modifications of the existing landscape character to dominate certain views, limit some public viewing opportunities, and reduce scenic quality; however, such impacts would be minimized to the extent possible through careful project location, minimal disturbance, and project design that would repeat the basic landscape elements.

Figure 4.1: VRM Class Designations in Acres under Alternative A in Parashant



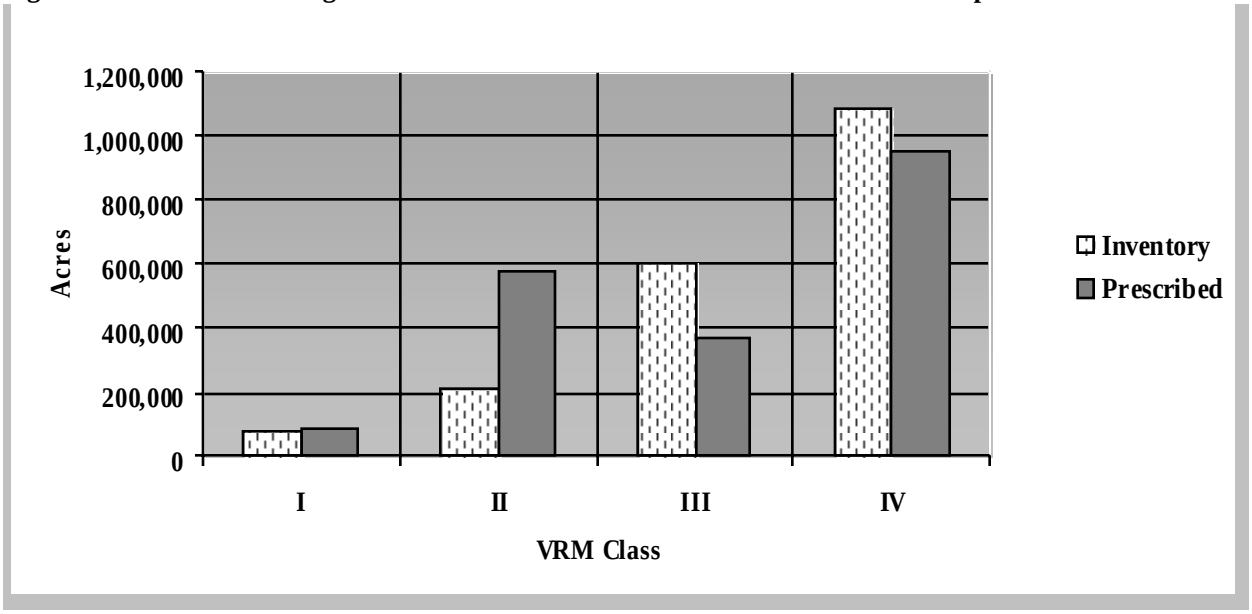
Vermilion: Under Alternative A, no lands in Vermilion would be managed at the Class III or IV standard. In addition, 85,223 acres of inventoried Class III and IV lands would be committed to a prescribed Class II visual standard, which would result in 72 percent more Class II acres than the revised inventory determined to be present (see Figure 4.2). Impacts to visual resources would be indirect and major, and involve the long-term maintenance of the existing character of the landscapes and retention of important scenic qualities and the opportunities for the public to view them.

Figure 4.2: VRM Class Designations in Acres under Alternative A in Vermilion



Arizona Strip FO: The designation of almost 364,380 acres of inventoried Class III and IV lands to a prescribed Class II visual standard in the Arizona Strip FO would result in a total of 573,243 acres of Class II (174 percent more Class II than the revised inventory determined to be present). Class I would affect 82,828 acres (3 percent more than inventoried); Class III would effect 374,725 acres (38 percent less than inventoried); and Class IV would effect 950,227 acres (12 percent less than inventoried; see Figure 4.3).

Figure 4.3: VRM Class Designations in Acres under Alternative A in the Arizona Strip FO



Impacts from Cultural Resources

The protective management of cultural resources would generally complement the maintenance of landscape character and the conservation of visual resources. Where excavation or restoration measures involving surface- or vegetation-disturbing activities, noticeable contrast or reduced scenic quality ratings could result. Impacts would be direct, localized, and short term, and could range from minor to moderate, depending on the type, scope, and magnitude of excavation/ restoration and the amount of change that it would cause to existing landscape form, line, color, or texture. The potential for reducing or restricting public access to cultural resources could reduce public opportunities to view some scenic resources. Such reduced opportunities could range from negligible to direct, long-term, and moderate, depending on the type and location of the restriction and its overlap with known scenic viewing locations.

Portions of the Old Spanish NHT are located in Vermilion and the Arizona Strip FO. Interim and long-term management of this trail aimed at retaining the trail's character would include provisions that would help protect visual resources within the trail corridor.

Impacts from Special Designations (Wilderness)

Management policies associated with BLM designated wilderness and NPS proposed wilderness (Parashant only) would contribute to preserving existing landscape character to a major degree over the long term.

Impacts from Livestock Grazing

Where livestock grazing continues to be authorized and/or allotments are managed as forage reserves, the installation of additional fences or livestock improvements (cattle guards, water developments, and roads necessary to access improvement sites) could directly impact visual resources by adding forms, lines, colors, and textures not found in the surrounding landscape. Such impacts would be localized, long term, and could range from negligible to moderate. Where livestock grazing would not be available on 199,350 acres in Parashant, the potential for the abovementioned impacts would be eliminated, effectively maintaining visual resource integrity over the long term. Any removal of livestock facilities in these areas would enhance visual resources in the long term by bringing the area back into its natural or near-natural condition. Moderate to heavy utilization of forage where livestock numbers are concentrated would create contrasts that would be noticeable to the casual observer. These impacts would typically be long term, direct, localized, and range from minor to moderate. The duration of such impacts would be reduced on 144,023 acres in the Arizona Strip FO where season of use restrictions would be instituted under Alternative A. Implementing the Arizona Standards for Rangeland Health on both BLM and NPS lands and maintaining Vital Sign resources in good condition or improving status on NPS lands would increase the potential for directly improving or enhancing visual resources. Impacts would be widespread, long term, and range from minor to moderate.

Impacts from Recreation and Visitor Services/Interpretation and Environmental Education

General: Impacts from relying on the maintenance and/or enhancement of remote, generally natural landscapes to sustain a variety of recreation activities and experiences would be short term and localized, and range from negligible to minor.

Special Recreation Management Areas/Special Management Areas: SRMAs would likely attract more visitor use to the Planning Area in the long term. Increased visitor use could generate localized visual contrasts in the form of dust from traffic, changes to camping areas, and potential impacts from illegal, off-road driving. More intensive management of these areas may enhance public access to scenic views and overlooks. The continuation of current management of the NPS-proposed wilderness Special Management Area (SMA) would complement the protection of visual resources.

Recreation Management Actions: Under Alternative A, maintaining and/or restoring natural, remote settings would help preserve visual landscapes over the long term. Current recreation management decisions aimed at minimizing signing in Area B, focusing the few recreation-

related facilities in roaded-natural portions of Area A, and signing to minimize OHV damage would complement protection of visual resources. The placement and design of recreation developments, facilities, and projects could contrast with the natural landscape, although they would be planned to minimize any potential contrasts and to meet the VRM objectives of the area, thus reducing impacts.

Recreation Monitoring: Establishing recreation carrying capacities could reduce recreation-related impacts to visual resource and reduce the potential of new impacts. Impacts would be indirect and range from negligible to minor.

Recreation Marketing: Providing information to visitors regarding recreation opportunities, interpretation of natural and human history, and specific rules and regulations would continue to improve land-use behaviors that are compatible with visual resources. Impacts would be direct and range from negligible to minor.

Recreation Administration: Dispersed recreation activities would create fewer impacts to visual resources than more intensive, concentrated recreation uses. Closing and/or rehabilitating undeveloped sites would restore the visual resources of those sites. Placing limits/restrictions on camping, recreation activities in sensitive areas, motor speed events, and competitive events would reduce recreation-related impacts on visual resources. Impacts would be long term. Requiring the use of weed-free feed for recreational stock would continue to reduce the potential for visual contrasts created by noxious weed infestations. Continuing visitor use limits in Paria Canyon and Coyote Buttes (Vermilion only) would complement the maintenance of visual resource conditions by reducing the potential for visual impacts attributable to larger numbers of visitors at-one-time at popular attraction sites.

Impacts from Lands and Realty

Management prescriptions related to acquisition, retention, and withdrawals, especially within the Monuments, would generally complement the maintenance of existing landscape character and public opportunities to view visual resources. Land use authorizations involving new surface- or vegetation-disturbing components, primarily restricted to the Arizona Strip FO, would result in direct, localized, short- and long-term impacts, which could include a reduction in scenic quality ratings. Such changes could range from minor to moderate, depending on the type of authorization and the amount of change it would cause to existing landscape form, line, color, or texture.

In the Arizona Strip FO, up to 25,188 acres could potentially leave Federal ownership through various forms of disposal. The potential for the loss of public viewing of scenic resources on these lands would be low. However, development of disposed lands could create minor to major, long-term, direct, localized visual contrasts with the surrounding landscape.

Alternative B

Impacts from Travel Management

Impacts from OHV closed area designations and prohibitions on new road construction would be similar to those described under Alternative A in the Monuments. Differing from Alternative A, TMAs would be identified under Alternative B. The Rural TMA would only apply to the Arizona Strip FO. Management of visual resources on 9 percent of this planning area in the Rural TMA would range from retaining the existing character of the landscape and scenic backdrops or settings for communities to providing for management activities that require major modifications. Because such modifications could be evident to the casual viewer, but would usually replicate the basic elements found in the predominant natural features of the characteristic landscape, the overall impact to visual resources in the Rural TMA could be minor to moderate. Management of the Backways TMA would retain the existing character of the landscape on 9 percent of Parashant, 2 percent of Vermilion, and 14 percent of the Arizona Strip FO. Although some modifications to the landscape would occur, because such modifications would be required to blend with the surrounding landscape, the overall impact to visual resources in the Backways TMA would be minor. Impacts from managing the Specialized TMA on 4 percent of Parashant, 12 percent of Vermilion, and 40 percent of the Arizona Strip FO, would range from retaining the existing character of the landscape to allowing major modification. Because such modifications could be evident to the casual viewer, although they would usually replicate the basic elements found in the predominant natural features of the characteristic landscape, the overall impact to visual resources in the Specialized TMA could range from minor to moderate. The majority of the Monuments (86-87 percent) would be managed under the Primitive TMA, while 37 percent of the Arizona Strip FO would be managed under this TMA. Impacts within this TMA could range from preserving to providing for partial retention of the existing character of the landscape. Although some modifications to the landscape would be allowed in the Primitive TMA, such modifications would need to be unnoticeable or blend with the surrounding landscape. As a result, impacts to visual resources in the Primitive TMA would range from negligible to minor.

In the long-term, the combined total of 1,740 miles of roads open to the public and to administrative use only in Parashant and 460 such miles open in Vermilion would bring about the types of visual influences described under Alternative A, although impacts would be reduced 24 and 17 percent, respectively, with fewer miles open under Alternative B. Since the majority of the 445 miles of routes in Parashant and 179 miles of routes in Vermilion proposed for closure and rehabilitation under Alternative B would be tertiary routes where existing visual influence is generally negligible to minor, the overall long-term, indirect enhancement to visual resources would only be negligible on a localized basis and minor on a widespread basis. Impacts from actions such as rerouting and monitoring the creation of unauthorized routes and closing those found would be the same as described under Alternative A. Overall impacts from intermittent dust and to night sky conditions would also be the same as described under Alternative A, even though there would be a 64 percent reduction in roads open to the public under Alternative B in

Parashant and 61 percent reduction in Vermilion. Based on information gathered from traffic counters on several primary roads, a 71 percent increase in annual traffic is expected to occur throughout Parashant over the life of the Plan. Traffic in Vermilion is expected to increase by 405 percent. Thus, although a 61 to 64 percent reduction in public open roads under Alternative B would reduce the amount of potential traffic on all roads, the actual use of the primary roads, where the majority of traffic occurs, is expected to remain static or experience a minor to major increase over the life of the Plan. The 52 to 63 percent reduction in open roads to the public, however, would affect opportunities to view some scenic resources if critical viewing routes are closed. Impacts would be long term and range from a moderate to major. The impacts from restricting travel to designated routes, route maintenance actions, and existing and new road material sites would be the same as described under Alternative A.

Impacts in the Arizona Strip FO from implementing Alternative B would differ from the Monuments in the following ways:

- The impacts of Closed OHV area designations in designated wilderness and Marble Canyon ACEC would take place on 92,648 acres or 25 percent less than Arizona Strip Alternative A.
- The effects of the designated Travel Management system for the Ferry Swale Sub-regions would occur on 34 miles of open public roads, 14 miles of administrative-use-only roads, and 0 miles of open for non-motorized/non-mechanized use; the combined total of 48 miles perpetuate the types of visual influences already described in Alternative A, only on 8 percent fewer miles.
- The visual effects of actions related to closed routes would take place on 7 miles closed and rehabilitated in the Arizona Strip, or a 133 percent increase from Alternative A.
- The impacts related to intermittent dust, night sky conditions, and viewing opportunities described in Parashant Alternative B would be similar in Arizona Strip, though attributable to 64 percent fewer open public roads from Alternative A and to the absence of any Open OHV areas and motorized speed events.
- Pending future route designation decisions, managing 4,934 miles of existing routes as a ‘preliminary route network’ (within the Littlefield, St. George Basin, Colorado City, Main Street, Uinkaret, Yellowstone Mesa, Kanab Plateau, Grama Canyon, Buckskin, White Sage, and House Rock Sub-regions), would be a continuation of the existing visual influence that existing system has on the landscape.
- Use of the primary roads could increase 173 percent over the life of the plan.
- Allowing motorized-vehicles to pull off designated routes 100 feet either side of centerline in “limited” area designations, may result in short-term and long-term, direct and localized negligible to moderate visual landscape changes.

Impacts from Wilderness Characteristics

The combination of management actions and allowable uses aimed at maintaining areas having wilderness characteristics would generally complement the retention or preservation of visual resources and existing landscapes. Under Alternative B, such complementary management

would occur on 39 percent of Parashant, 33 percent of Vermilion, and 2 percent of the Arizona Strip FO, which does not include existing wilderness or NPS-proposed wilderness.

Impacts from Vegetation and Fire and Fuels Management

Localized impacts to visual resources from restoration and vegetative treatment methods would be the same as those described under Alternative A. However, impacts would be less widespread under Alternative B because only 2 to 3 percent of each of the three planning areas could be treated, which would result in a major reduction in potential impacts to visual resources compared to Alternative A (under which the entire Monument could be treated). Such treatments would also be limited to two ecological zones in Parashant and the Arizona Strip FO and one ecological zone in Vermilion, limiting the area of impact compared to Alternative A where all ecological zones could be treated. Impacts from the possible treatments proposed under Alternative B would be long-term, site-specific, and range from negligible to minor. The potential for moderate to major, short- and long-term impacts on NPS lands in Parashant would be reduced by prohibiting chaining and other methods that cause substantial surface disturbance; however, such impacts could occur on BLM lands. Potential impacts to opportunities to view some scenic resources due to possible seasonal restrictions, temporary reductions, or elimination of authorized activities in some vegetation treatment areas would be the same as described under Alternative A. Restoration efforts proposed for Pakoon Springs would have negligible impacts to visual resources in that allotment while closing the Cane Springs pasture of the Mud and Cane Allotment and removing the fencing around the spring under Alternative B would slightly enhance visual resources in the area. Restoration efforts to remove invasive plant species along the Paria River would be limited to the use of non-powered, hand tools. As a result, the scope of any one project would be minimized, and impacts would be short term and minor.

Under Alternative B, the wilderness management plan would be amended to allow for wildland fire use to be used for restoration efforts in the Ponderosa Pine forest of Mt. Trumbull, which could result in minor to moderate impacts to visual resources in the short term, and negligible to minor impacts in the long term. Because the results of management-ignited fire can emulate natural-ignition fires and natural ecological change, the use of fire to restore ecological condition and enhance wilderness character could meet VRM Class I objectives. The application of minimum impact suppression tactics and minimum tool policy for fire operations in wilderness and NPS-proposed wilderness areas would be the same as described under Alternative A.

Impacts to visual resources from prevention and mitigation programs, wildland fires, prescribed fires, and post fire rehabilitation methods and efforts would be the same as described under Alternative A, as would impacts to night sky conditions from operating large fire management camps.

Impacts to visual resources from noxious weed prevention/elimination would be the same as described under Alternative A, as would research/restoration-related use of vegetative materials, but only on the acres described above for restoration treatments.

Impacts from Soil, Water, and Air

Impacts from Air, Water, and Soil would be the same as described under Alternative A, with the exception that, under the soils program, impacts from watershed improvements/treatments would primarily be localized in the Upper Lang's Run, Black Rock Mountain, Upper Parashant, Lower Hurricane Valley, Fort Pearce Salinity Area, Clayhole Flood Control Structures Area, and Wild Band Valley watersheds in Parashant and/or Arizona Strip FO. Riparian and watershed improvements/treatments would be considered for all watersheds in Vermilion, which would affect visual resources in a manner similar to general impacts that would stem from vegetation management.

Impacts from Fish and Wildlife

Impacts would be the same as described under Alternative A, with a few exceptions. Under Alternative B, public access for hunting and wildlife viewing opportunities could be greatly reduced by route designation decisions. No new water developments or improvements would occur on NPS lands in Parashant, preventing the creation of new visual contrasts related to such developments. In addition, fences not necessary for range management or other administrative purposes would be removed under Alternative B, which would improve visual landscape conditions. Finally, in the Arizona Strip FO, protective management prescribed for Bighorn Sheep ACECs would generally complement retention of visual resources on 48,076 acres or two percent of the Arizona Strip. Impacts would be long term and localized, ranging from minor to moderate.

Impacts from Special Status Species

Overall impacts would be the same as described under Alternative A.

Impacts from Visual Resources

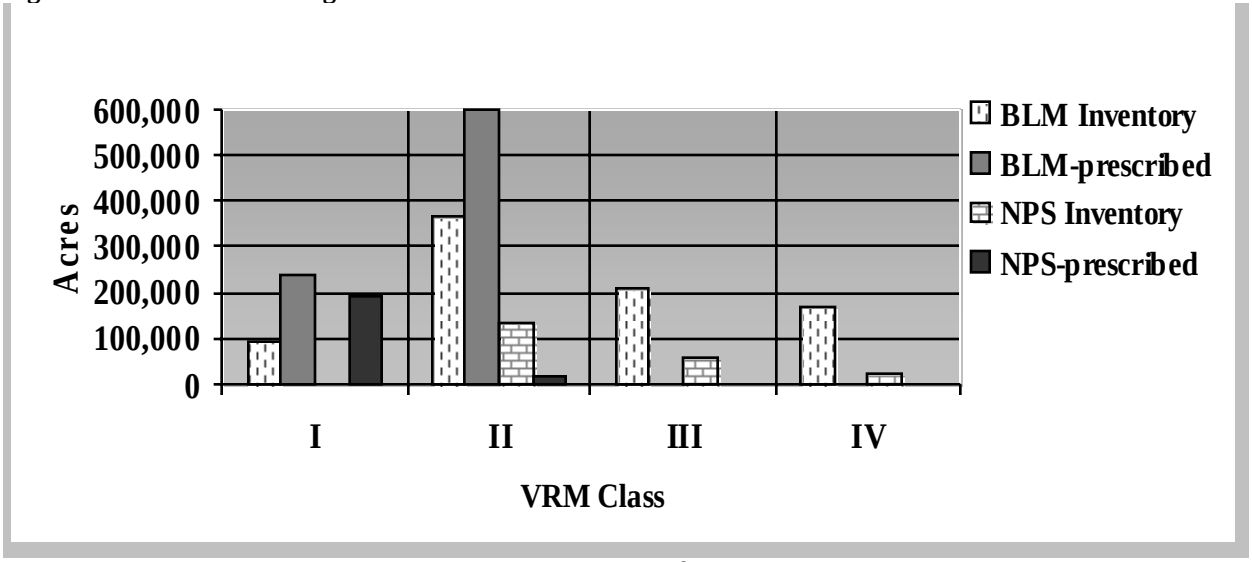
Impacts from future congressional designations, prohibiting activities that could not be mitigated to achieve long-term visual objective(s), and from the use of the VRM contrast rating process would be the same as described under Alternative A. Allowing research/restoration actions to exceed VRM class objectives in the short term (0-5 years) but not in the long term (over 5 years) under Alternative B would likely result in noticeable, short-term impacts to research/restoration sites and viewing opportunities near those sites. Impacts would be direct and range from negligible to minor. Bringing existing facilities or other landscape contrasts into conformance with visual objectives would enhance local scenic conditions and viewing opportunities. Indirectly, night sky conditions would be maintained over the long term under Alternative B, as actions would be prohibited that create artificial light at night.

Under Alternative B, all BLM and NPS lands would be assigned to Class I and II in Parashant and Vermilion, except 12 acres in each Monument that would be assigned to Class IV. Alternative B would thus provide the greatest contribution to maintaining the "remote character" of the Monuments. How impacts to each of the three planning areas relating to specific VRM class designations under Alternative B compare to Alternative A are presented below:

Parashant: The types of impacts to visual resources from designating VRM Class I under Alternative B would be similar to those described under Alternative A, albeit more widespread as roughly 32 percent more of the Monument would be designated to this VRM Class, including all 190,478 acres of NPS-proposed wilderness lands and 145,084 acres identified with wilderness characteristics.

Designating the remainder of the Monument as VRM Class II (except 12 acres as Class IV) would represent a 64 percent increase over the inventoried Class II BLM lands compared to Alternative A, and an 87 percent decrease from the inventoried NPS Class II lands (those lands would be designated VRM Class I, as discussed above; see Figure 4.4). The types of impacts from VRM Class II designations would be similar to those described under Alternative A, although more widespread as 77 percent more lands would be designated VRM Class II under Alternative B. Impacts to visual resources would be indirect and major, and involve the long-term conservation of landscapes and retention of important scenic qualities and the opportunities for the public to view them. Additionally, under Alternative B, visual resources on 59 percent of the Monument with inventoried Class III and IV values would be managed under VRM Class I and II, which would provide long-term maintenance of the existing character of the landscape.

Figure 4.4: VRM Class Designations in Acres under Alternative B in Parashant



Vermilion: Under Alternative B, 42 percent more of the Monument would be designated VRM Class I compared to the total acres of identified VRI Class I lands. Designating the remainder of the Monument to VRM Class II would represent a 40 percent increase over the inventoried Class II lands, although this would represent a decrease compared to Alternative A, as those lands would be designated VRM Class I and thus experience more long-term conservation/retention of the existing landscape. Additionally, visual resources on 29 percent of the of the Monument with inventoried Class III and IV values would be managed under VRM Class I and II, which would provide long-term maintenance of the existing character of the landscape. The remaining 12 acres are where the various existing mineral material sites are located and would be assigned to Class IV, which would allow for localized, moderate, and long-term visual contrast. Figure 4.5 illustrates the VRM Class designations under Alternative B in Vermilion.

Arizona Strip FO: Under Alternative B, 11 percent more would be designated VRM Class I compared to Alternative A, which would be 13 percent more than the total acres of identified VRI Class I lands. The additional acreage is associated with some areas having wilderness characteristics. The designation of 437,256 acres to a Class II VRM standard would represent a 109 percent increase over the inventoried Class II lands and a 24 percent decrease from Alternative A. The designation of 1,379,468 acres to a Class III VRM standard would represent a 128 percent increase over the inventoried Class III lands and a 268 percent increase from Alternative A. The designation of 72,803 acres to a Class IV standard would represent a 93 percent decrease from the inventoried Class IV lands and Alternative A. Figure 4.6 illustrates the VRM Class designations under Alternative B in the Arizona Strip FO.

Figure 4.5: VRM Class Designations in Acres under Alternative B in Vermilion

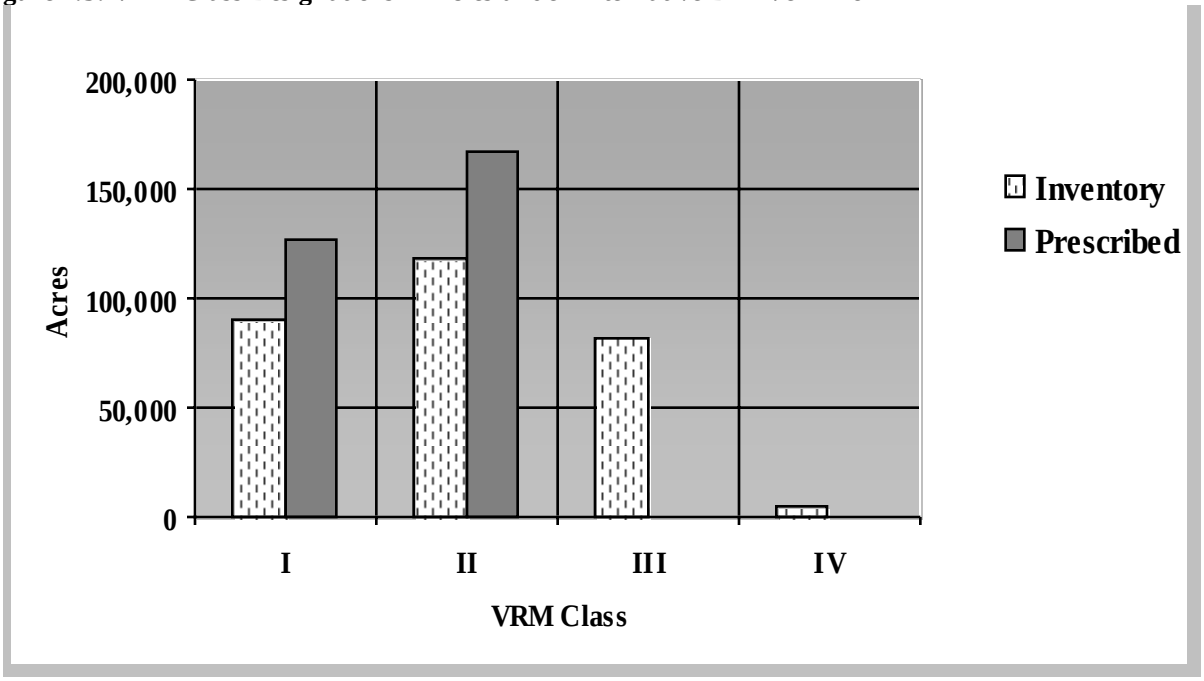
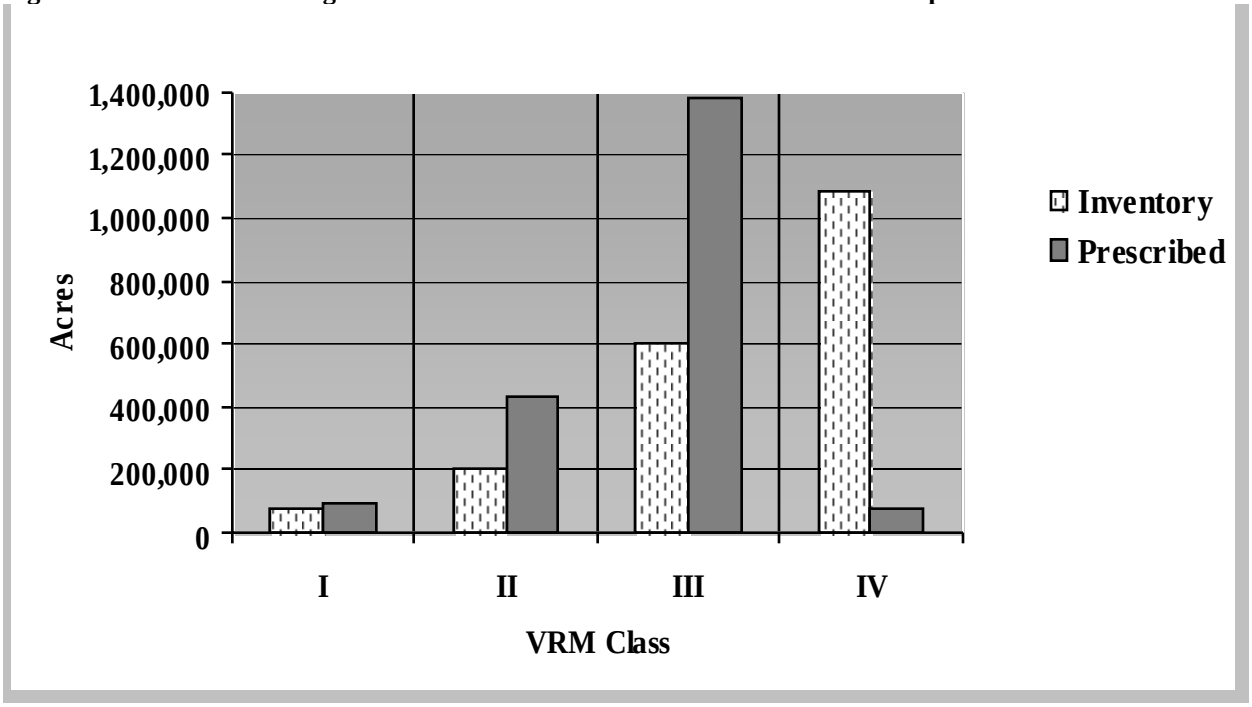


Figure 4.6: VRM Class Designations in Acres under Alternative B in Arizona Strip FO



Impacts from Cultural Resources

Overall impacts would be the same as described under Alternative A.

Impacts from Special Designations (Wilderness)

Impacts would essentially be the same as those described in Alternative A, with the exception that NPS-proposed wilderness lands would also be designated VRM Class I, thus receiving the same protection as designated wilderness on BLM lands.

Impacts from Livestock Grazing

Overall impacts would be similar to those described under Alternative A, except that additional improvements to visual resources would occur because approximately twice as many acres in Parashant and over 127,267 additional acres in the Arizona Strip would be unavailable to livestock grazing under Alternative B. In addition, 15,610 additional acres would be unavailable in Vermilion, improving visual resources in the Lees Ferry Allotment.

Impacts from Recreation and Visitor Services

General: Impacts would be the same as those described under Alternative A.

Special Recreation Management Areas/Special Management Areas: A little over one-half the acres of Monument lands and 36 percent less lands in the Arizona Strip FO would be identified and managed as SRMAs compared to Alternative A, which could result in lower levels of recreation-related impacts to visual resources under Alternative B.

Recreation Management Actions: Under Alternative B, maintenance and restoration of natural, remote settings would rely solely on natural processes, which would bring about a slower, less-noticeable visual change than would more proactive, project-oriented restoration actions proposed under the other alternatives, including Alternative A. Proactively developing more specific signing and interpretive plans tied to management units and preserving Monument objects would aid in protecting and/or enhancing visual resources and the opportunities to view them by visitors. Impacts would be long term and range from minor to moderate. Impacts from recreation facility development would be similar to Alternative A; however, facilities would have to conform to management unit goals.

Recreation Monitoring: Impacts would be the same as those described under Alternative A.

Recreation Marketing: Under Alternative B, not promoting visitor access where increased visitation could create unacceptable changes to sensitive resources would reduce the potential for visitor-related impacts to visual resources. Impacts would be indirect, long term, and localized, and range from minor to moderate. Identifying and eventually increasing in the use of driving tours routes would enhance opportunities to view scenic resources. Impacts would be direct and long term. On the other hand, increased use of driving routes would increase fugitive dust along such routes. These impacts would be direct, localized, and short term.

Recreation Administration: Overall impacts would be the same as those described under Alternative A, with the exception that limiting vehicle camping to designated sites would further reduce localized impacts to visual resources from camping. In addition, prohibiting the commercial use of horses and pack stock in Paria Canyon could reduce the potential for long-term, negligible to minor impacts to viewing opportunities and the creation of visual contrasts.

Impacts from Lands and Realty

Impacts would essentially be the same as those described under Alternative A. The only exception is that ongoing maintenance by Arizona Department of Transportation (ADOT) of existing drainage structures/areas on the north side of Highway 89A in Vermilion would create direct, short-term, localized minor to moderate visual contrasts.

Alternative C

Impacts from Travel Management

Impacts from OHV closed area designations and prohibitions on new road construction in the Monuments would be similar to those described under Alternative A. The types of impacts to visual resources from the management of TMAs would be the same as described under Alternative B, although 18 percent more of Parashant and 18 percent more of Vermilion would experience minor to moderate impacts related to being managed as the Specialized TMA, while 21 percent less of Parashant and 18 percent less of Vermilion would experience negligible to minor impacts related to being managed as the Primitive TMA. In addition, The Rural TMA would be delineated on less than 1 percent of Vermilion. Since the acres proposed for each TMA varies slightly between Alternatives B and C in the Arizona Strip FO (within +/- 2 percent), differences in impacts would be minimal.

Under Alternative C, the combined total of 1,519 miles of roads in Parashant and 446 miles in Vermilion proposed open to the public and to administrative use would be a 13 percent and 3 percent reduction, respectively, compared to Alternative A. Long-term impacts from travel on these roads would be similar to those described under Alternative A, albeit somewhat reduced. Impacts from route closures and rehabilitation would be similar to those described under Alternative B, although not as intense and widespread as only half as many routes would be closed under Alternative C. Impacts from rerouting and monitoring the creation of unauthorized routes and closing those found would be the same as those described under Alternative A. Impacts from intermittent dust and to night sky conditions would also be similar those described under Alternative A, although reduced due to the reduction in roads open to the public compared to Alternative A. This reduction would also result in minor, long-term impacts to public opportunities to view some scenic resources if critical viewing routes are closed. The impacts from restricting travel to designated routes, route maintenance actions, and existing and new road material sites would be similar to those described under Alternative A, although additional route improvement activities (e.g., grading, widening, realignment, etc,) could create localized, long-

term, minor to moderate impacts within standard maintenance widths, rather than merely within existing roadbed disturbance zones.

Impacts in the Arizona Strip FO from implementing Alternative C would differ from the Monuments in the following ways:

- The effects of the designated Travel Management system for the Ferry Swale Sub-regions would occur on 48 miles of open public roads, 5 miles of administrative use only roads, and 0 miles of open for non-motorized/non-mechanized use; the combined total of 53 miles perpetuate the types of visual influences already described in Alternative A, only on less than 1 percent fewer miles.
- The visual impacts of actions related to closed routes would take place on 2 miles closed and rehabilitated in the Ferry Swale area of the Arizona Strip, or a 71 percent decrease from Alternative B.
- The impacts related to intermittent dust, night sky conditions, and viewing opportunities described in Parashant Alternative B could be similar in the Littlefield and Ferry Swale Sub-regions, though attributable to 8 percent fewer open public roads than Alternative A.
- Use of the 1,481-acre Open OHV area designations and the larger motorized speed event area could impact visual resources with negligible to moderate amounts of airborne dust on a short-term, localized basis. The Open OHV areas could result in minor to moderate visual contrast over the long-term as unlimited off-road use creates new routes.
- The effects of a 'preliminary route network' pending future route designation decisions for applicable sub-regions would be similar to Alternative B; however, for those sub-regions or parts of sub-regions that would be within a 'limited to existing roads and trails' OHV area designation, the impacts to visual resources would be similar to those described for Parashant under Alternative A.

Impacts from Wilderness Characteristics

Overall impacts would essentially be the same as those described under Alternative B. Complementary management relating to wilderness characteristics would occur on roughly 45 and 58 percent less acres than proposed under Alternative B in Parashant and Vermilion, respectively. There would be approximately 68 percent more acres than proposed under Alternative B in the Arizona Strip FO.

Impacts from Vegetation and Fire and Fuels Management

Localized impacts to visual resources from restoration and vegetative treatment methods would be the same as those described under Alternative A. However, only 10 percent of Parashant and the Arizona Strip FO and 14 percent of Vermilion could be treated, which would be a major reduction in potential impacts compared to Alternative A (under which the entire Monument could be treated), although the potential for impacts would be greater than under Alternative B. Impacts from treating 10 – 14 percent of the Monument would be long term and minor, and be

restricted to three ecological zones on NPS lands, but more widespread on BLM lands as they would potentially occur in all ecological zones. Under Alternative C, impacts due to restrictions on chaining and other methods that cause substantial surface disturbance would be the same as described under Alternative A. Potential impacts to public opportunities to view some scenic resources due to possible seasonal restrictions, temporary reductions, or elimination of authorized activities in some vegetation treatment areas would be the same as under Alternative A. Under Alternative C, active restoration methods would be employed at Pakoon Springs, which could result in short-term, minor to moderate impacts, depending upon method used. In the long term, a restored wetland area would moderately enhance both visual quality and the opportunities for public viewing. Closing Cane Springs to grazing and installing fencing around the springs would enhance existing visual resources, while developing the site for interpretation would moderately enhance public opportunities for viewing riparian scenery. While a rest area/picnic area would further enhance such viewing opportunities, facility development to accomplish that aim could produce direct, localized, visual contrast that may not meet VRM Class II objectives. Impacts would range from minor to moderate.

Impacts to night sky conditions from operating large fire management camps would be the same as described under Alternative A. The application of minimum impact suppression tactics and minimum tool policy for fire operations in wilderness and NPS-proposed wilderness areas would indirectly be the same as described under Alternative A. Impacts to visual resources from prevention and mitigation programs and wildland fires, prescribed fires, and post fire rehabilitation methods and efforts would be the same as under Alternative A.

Impacts to visual resources from noxious weed prevention/elimination would be the same as described under Alternative A, with the exception that impacts from using non-motorized hand tools to remove invasive weeds along the Paria River would be the same as described under Alternative B. Impacts from restoration treatments at Mt. Trumbull would be the same as described under Alternative B. Impacts from research/restoration-related use of vegetative materials would be the same as described under Alternative A, but only on the acres described above for restoration treatments.

Impacts from Soil, Water, and Air

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

Impacts from Fish and Wildlife

Under Alternative C, public access for hunting and wildlife viewing opportunities could be somewhat reduced by route designation decisions compared to Alternative A, although impacts would be not as intense as under Alternative B. The types of impacts from the management of Watchable Wildlife areas would be similar to those described in Alternative A, although more widespread as four new Watchable Wildlife areas would be identified in Parashant, one in Vermilion, and five in the Arizona Strip FO.

Impacts from management activities carried out to restore native wildlife populations would be the same as described under Alternative A. Impacts related to the construction of wildlife habitat improvement projects and fences in pronghorn habitat would be the same as those described under Alternative B.

Impacts from Special Status Species

Impacts would essentially be the same as those described under Alternative A.

Impacts from Visual Resources

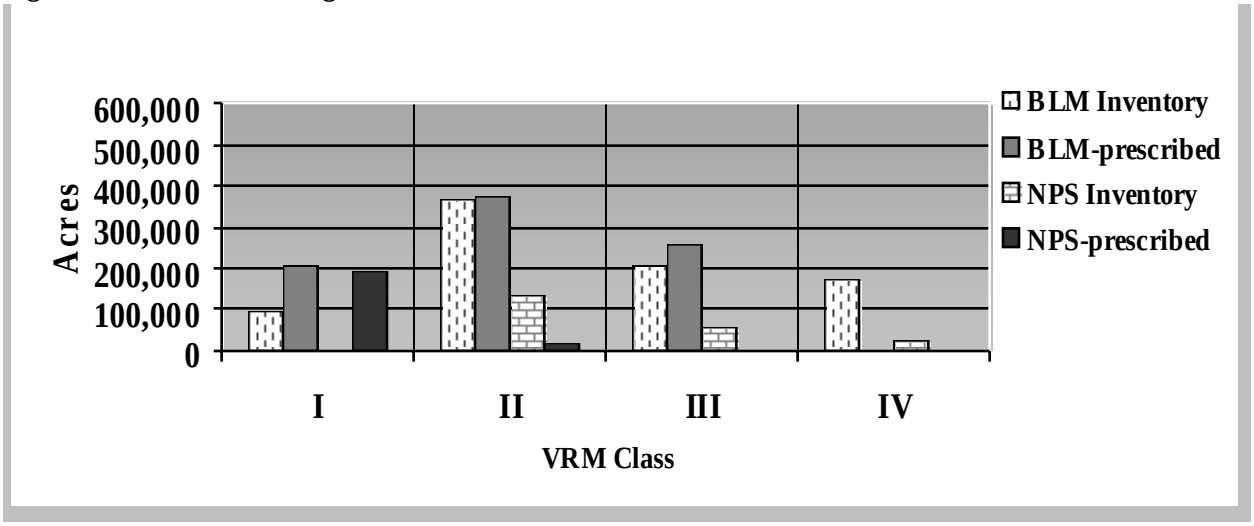
Impacts from future congressional designations of wilderness or wild and scenic rivers would be the same as described under Alternative A. Impacts from prohibiting activities that could not be mitigated to achieve long-term visual objective(s) and from the use of the VRM contrast rating process would be the same as described under Alternative A. Allowing research/restoration actions that would be allowed to exceed VRM objectives would have the same short-term effects as described under Alternative B. Under Alternative C, the requirement that new facilities not attract attention at night would directly contribute to maintaining current night sky conditions in the short-term and moderately reducing the potential for new artificial light sources in the long-term. Additionally, night sky conditions could moderately improve over the long-term through direct mitigation of existing artificial light sources in the Monument.

How impacts to each of the three planning areas relating to specific VRM class assignments under Alternative C compare to Alternative A and/or B are presented below:

Parashant: Impacts from designating VRM Class I under Alternative C would be similar to that described under Alternative B, although slightly reduced due to 8 percent fewer acres being designated in Parashant. The types of impacts to visual resources and their availability for viewing by the public would be the same as described under Alternative B; however, the overall commitment to both Class I and II visual standards under Alternative C would cover 25 percent fewer acres than proposed under Alternative B and 75 percent more than proposed under

Alternative A. As Figure 4.7 demonstrates, 32 percent more lands would be assigned to Class I and II than the VRI determined to be present. Due to the nature of the Class III objectives, existing visual resources and viewing opportunities could be affected in the short-term by management practices that have the potential to create contrast, such as certain types of vegetation treatments. Impacts would be direct and range from minor to moderate.

Figure 4.7: VRM Class Designations in Acres under Alternative C in Parashant



Vermilion: Under Alternative C for Vermilion, impacts from VRM Class I designations would be similar to those described under Alternative B, albeit on 17 percent fewer acres. Impacts from the overall commitment to both Class I and II visual standards under Alternative C would be similar to Alternatives A and B as only one percent fewer acres would be covered, which would represent 41 percent more than the VRI determined to be present (see Figure 4.8).

Arizona Strip FO: The designation of 80,760 acres to Class I would represent about the same acreage that was inventoried and two percent less acres than under Alternative A (see Figure 4.9). The designation of 202,091 acres to a Class II VRM standard would represent three percent less than the inventoried Class II lands and a 65 percent decrease from Alternative A. The designation of 1,625,409 acres to a Class III VRM standard would represent a 168 percent increase over the inventoried Class III lands and a 334 percent increase from Alternative A. The effects of a Class IV standard would be the same as described for the Arizona Strip FO under Alternative B.

Figure 4.8: VRM Class Designations in Acres under Alternative C in Vermilion

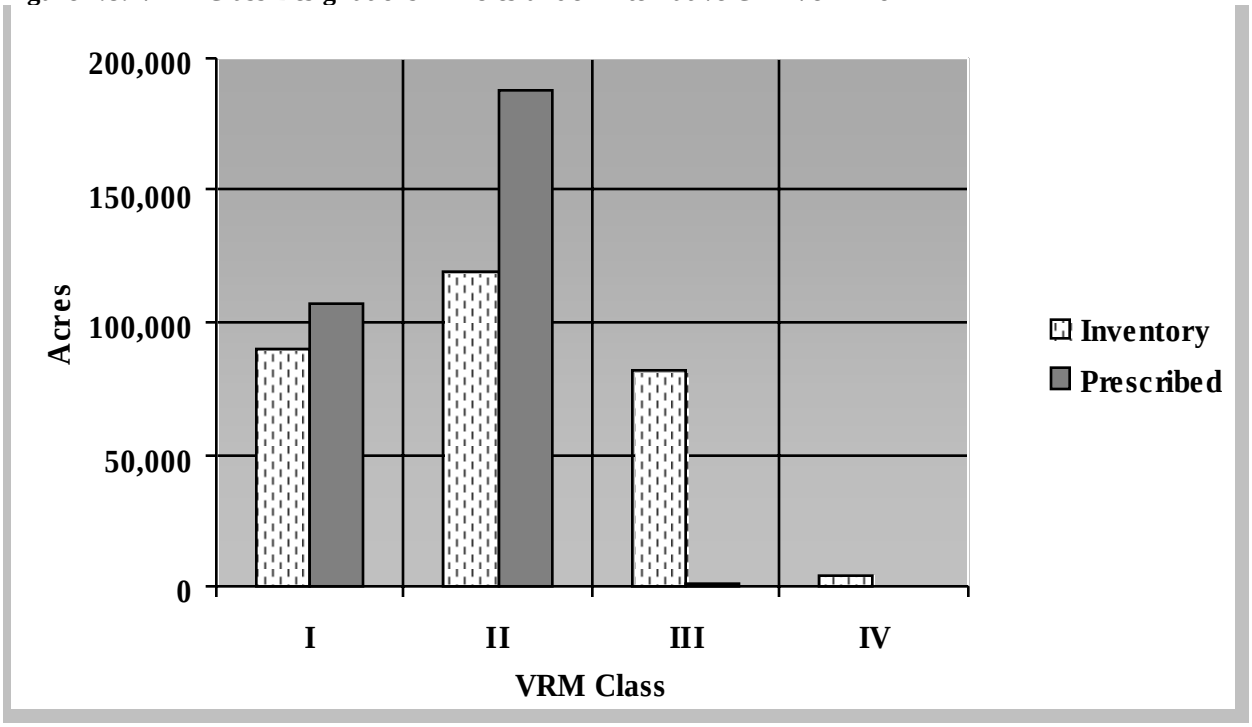
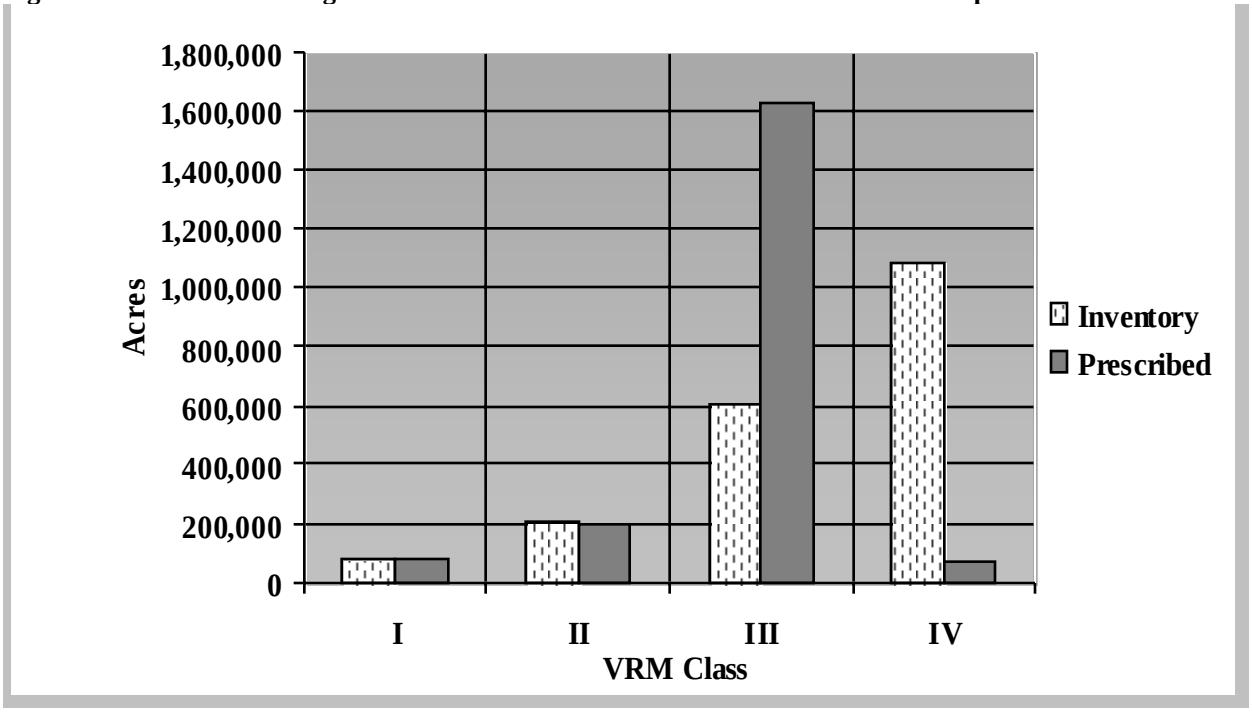


Figure 4.9: VRM Class Designations in Acres under Alternative C in the Arizona Strip FO



Impacts from Cultural Resources

Overall impacts would be the same as those described under Alternative A.

Impacts from Special Designation (Wilderness)

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

Impacts from Livestock Grazing

Overall impacts would be similar to those described under Alternative A, although some improvement in visual quality would occur on 16 percent more acres that would be unavailable for livestock grazing and 49,113 additional acres that would receive seasonal restrictions in Parashant. In the Arizona Strip FO, impacts could occur on 0 acres unavailable for grazing under Alternative A, although seasonal restrictions would limit impacts on 151,475 acres. Impacts in Vermilion would be the same as described under Alternative A.

Impacts from Recreation and Visitor Services

General: Impacts would be the same as those described under Alternative A**.**

Special Recreation Management Areas/Special Management Areas: Overall impacts from SRMA identification and management would be similar to Alternative A, albeit more widespread in Parashant due to over two and a half times more acres being allocated as SRMAs. Impacts would also be more widespread in the Arizona Strip FO, as 16 percent more lands would be allocated as SRMAs. Impacts would be slightly increased in Vermilion as 227 percent more lands would be identified as SRMAs under Alternative C compared to Alternative B and remain the same when compared to Alternative A.

Recreation Management Actions: Impacts from maintenance and restoration of natural, remote settings would be similar to Alternative A. However, the possible use of active restoration projects in tandem with natural processes could create negligible to moderate visual contrast, depending on the type of method chosen. The impacts of the remaining recreation management actions would be similar to Alternative B.

Recreation Monitoring: Overall impacts would be similar to those described under Alternative A, with the exception that using the LAC model could increase potential for timelier, appropriate response to recreation-caused resource impacts that affect visual resources.

Recreation Marketing: Impacts would be the same as those described under Alternative B.

Recreation Administration: Overall impacts would be the same as those described under Alternative A, with the exception that possible extensions beyond the 14-day camping limit could slightly increase impacts.

Impacts from Lands and Realty

Impacts would essentially be the same as those described under Alternative A for Parashant and the Arizona Strip FO, but similar to Alternative B for Vermilion.

Alternative D

Impacts from Travel Management/Transportation Facilities

Impacts from OHV closed area designations and prohibitions on new road construction in the Monuments would be similar to those described under Alternative A. In Vermilion and the Arizona Strip FO, the types of impacts to visual resources from the management of TMAs would be similar to those described under Alternative C due to similar allocations (+/- 1 percent). In Parashant, 21 percent more lands in that Monument would experience minor to moderate impacts related to being managed as the Specialized TMA compared to Alternative B (5 percent more compared to Alternative C), while 20 percent less of the Monument would experience negligible to minor impacts related to being managed as the Primitive TMA (5 percent less compared to Alternative C.

Under Alternative D, the combined total of 1,614 miles of roads proposed open to the public and to administrative use in Parashant and 467 miles in Vermilion would be a 7 percent reduction and 2 percent increase, respectively, compared to Alternative A. This would represent an increase compared to Alternatives B and C. Long-term impacts from travel on these roads would be similar to those described under Alternative A, albeit slightly reduced. Impacts from route closures and rehabilitation would be similar to those described under Alternative B, although not as intense or widespread as less than one-third (36 percent) as many routes would be closed under Alternative D in Parashant and less than a half in Vermilion. Impacts from actions such as rerouting and monitoring the creation of unauthorized routes and closing those found would be the same as described under Alternative A. Impacts from intermittent dust and to night sky conditions would also be similar to those described under Alternative A, although somewhat reduced due to a reduction in roads open to the public compared to Alternative A. The reduction would also result in a negligible, long-term impact to the public's opportunity to view some scenic resources if critical viewing routes are closed. The impacts from restricting travel to designated routes, route maintenance actions, and existing and new road material sites would be the same as described under Alternative A, with the exception that route upgrades would have to be consistent with desired management unit goals and TMA objectives, which would complement the protection of visual resources.

Impacts in the Arizona Strip FO from implementing Alternative D would differ from the Monuments in the following ways:

- The effects of the designated Travel Management system for the Ferry Swale Sub-regions would occur on 51 miles of open public roads, 3 miles of administrative use only roads, and 0 miles of open for non-motorized/non-mechanized use; the combined total of 54 miles perpetuate the types of visual influences already described under Alternative A, only on less than 1 percent fewer miles.
- The visual impacts of actions related to closed routes would take place on 1 miles closed and rehabilitated routes in the Ferry Swale Sub-regions, or a 66 percent increase from Alternative A.
- The impacts related to intermittent dust, night sky conditions, and viewing opportunities described in Parashant Alternative B would be similar in the Littlefield and Ferry Swale Sub-regions, though attributable to 11 percent fewer open public roads than Alternative A.
- Use of the 7,186-acre Open OHV area designations (385 percent larger that proposed under Alternative C) and the case-by-case consideration of motorized speed events anywhere in the Arizona Strip could impact visual resources with minor to major amounts of airborne dust on a short-term, localized basis. The Open OHV areas could result in moderate visual contrast over the long term as unlimited off-road use creates new routes.
- The effects of a 'preliminary route network' pending future route designation decisions for applicable sub-regions would be similar to Alternative B, however, for those sub-regions or parts of sub-regions that would be within a 'limited to existing roads and trails' OHV area designation, the impacts to visual resources would be similar to those described for Parashant Alternative A.

Impacts from Wilderness Characteristics

Overall impacts would essentially be the same as those described under Alternative B for Parashant and Arizona Strip FO, albeit less widespread as complementary management relating to wilderness characteristics would occur on 62 percent less acres under Alternative D. Similar to Alternative A, no areas with wilderness characteristics are proposed for management in Vermilion under Alternative D. There would be 25 percent fewer acres proposed in Arizona Strip FO under Alternative D than Alternative B.

Impacts from Vegetation and Fire and Fuels Management

Localized impacts to visual resources from restoration and vegetative treatment methods would be the same as those described under Alternative A. However, impacts would be less widespread under Alternative D, as only 20 percent of Parashant, 22 percent of the Arizona Strip FO, and 31 percent of Vermilion could be treated, which would be a major reduction in potential impacts compared to Alternative A (under which the entire Monument could be treated), but would pose a greater potential for impacts compared to Alternative B and C. Impacts from treating 20-31 percent of the three planning areas would be long-term and widespread, as some

treatments would be conducted in all ecological zones. Under Alternative D, impacts due to restrictions on chaining and other methods that cause substantial surface disturbance in VRM Class I and II areas would be the same as described under Alternative A. Potential impacts to public opportunities to view some scenic resources due to possible seasonal restrictions, temporary reductions, or elimination of authorized activities in some vegetation treatment areas would be the same as Alternative A. Impacts from restoration activities at Pakoon Springs would be similar to those described under Alternative C. In addition, developing the site for interpretation would moderately enhance public opportunities for viewing riparian scenery. While a campground/picnic area would further enhance such viewing opportunities, facility development to accomplish that aim could produce direct, localized, and minor to moderate visual contrast that may not meet VRM Class II objectives. Impacts from the continuation of grazing and the installation of fencing around upper Cane Spring would be similar to those described under Alternative A.

Potential impacts from fire-related ecological restoration activities on Mt. Trumbull would be the same as described under Alternative B. However, the "falling and bucking" of smaller diameter trees and brush adjacent to old growth trees would produce localized, short-term visual contrast that would not meet VRM Class I objectives. Initial and repetitive burning of treatment areas would consume felled trees and stumpage, reducing the visual contrast to meet Class I objectives over the long term. Impacts to night sky conditions from operating large fire management camps would be the same as under Alternative A. Impacts from minimum impact suppression tactics and minimum tool policy for fire operations in wilderness and NPS-proposed wilderness areas would be the same as described under Alternative A, as would impacts from prevention and mitigation programs and from wildland fires, prescribed fires, and post fire rehabilitation efforts.

Impacts to visual resources from noxious weed prevention/elimination would be the same as described under Alternative A, as would research/restoration-related use of vegetative materials, but only on the acres described above for restoration treatments. Impacts from using non-motorized hand tools to remove invasive weeds along the Paria River would be the same as described under Alternative B.

Impacts from Air, Water, and Soil

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

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative C, with the exception that the reduction in public access for hunting and wildlife viewing opportunities would not be as great when compared to Alternative A.

Impacts from Special Status Species

Impacts would essentially be the same as those described in Alternative A.

Impacts from Visual Resources

Impacts from future congressional designations of wilderness or wild and scenic rivers would be the same as described under Alternative A. The effects of prohibiting activities that could not be mitigated to achieve long-term visual objective(s) and the use of the VRM contrast rating process would be the same as described under Alternative A. Impacts research/restoration actions that would be allowed to exceed onsite VRM objectives would have the same short-term effects described under Alternative B. Impacts to night sky conditions would essentially be the same as those described under Alternative C.

How impacts to each of the three planning areas relating to specific VRM class designations under Alternative D compare to the previous alternatives is presented below:

Parashant: Under Alternative D, the types of impacts to visual resources from VRM Class I designations would be similar to that described under Alternative B and C, but on 60 percent and 53 percent fewer acres respectively. The overall commitment to both Class I and II visual standards on under Alternative D would be 28 percent less than proposed under Alternative B, 27 more than the VRI determined to be present (see Figure 4.10), and 71 percent more than proposed under Alternative A.

Vermilion: Impacts would essentially be the same as those described under Alternative A, with the exception that designating 12 total acres at various existing mineral material sites as VRM Class IV would cause long-term, localized, and moderate visual contrasts. Figure 4.11 illustrates the discrepancies between VRM classes proposed and VRI classes.

Figure 4.10: VRM Class Designations in Acres under Alternative D in Parashant

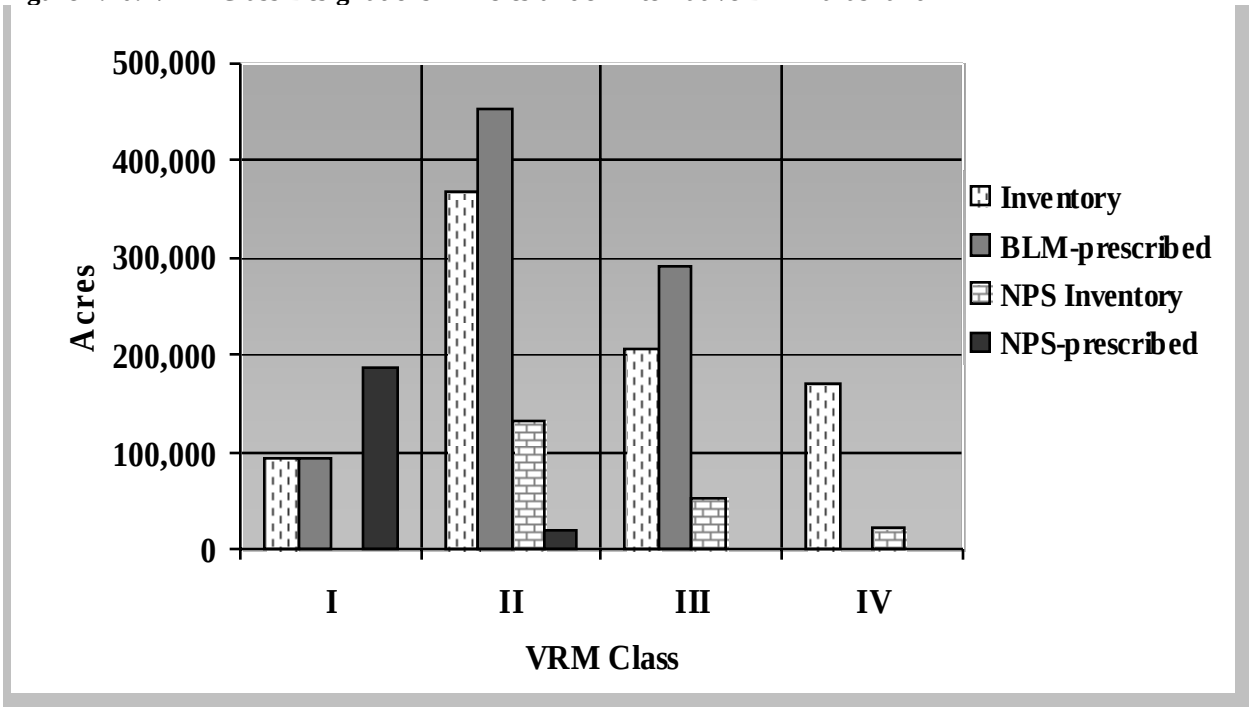
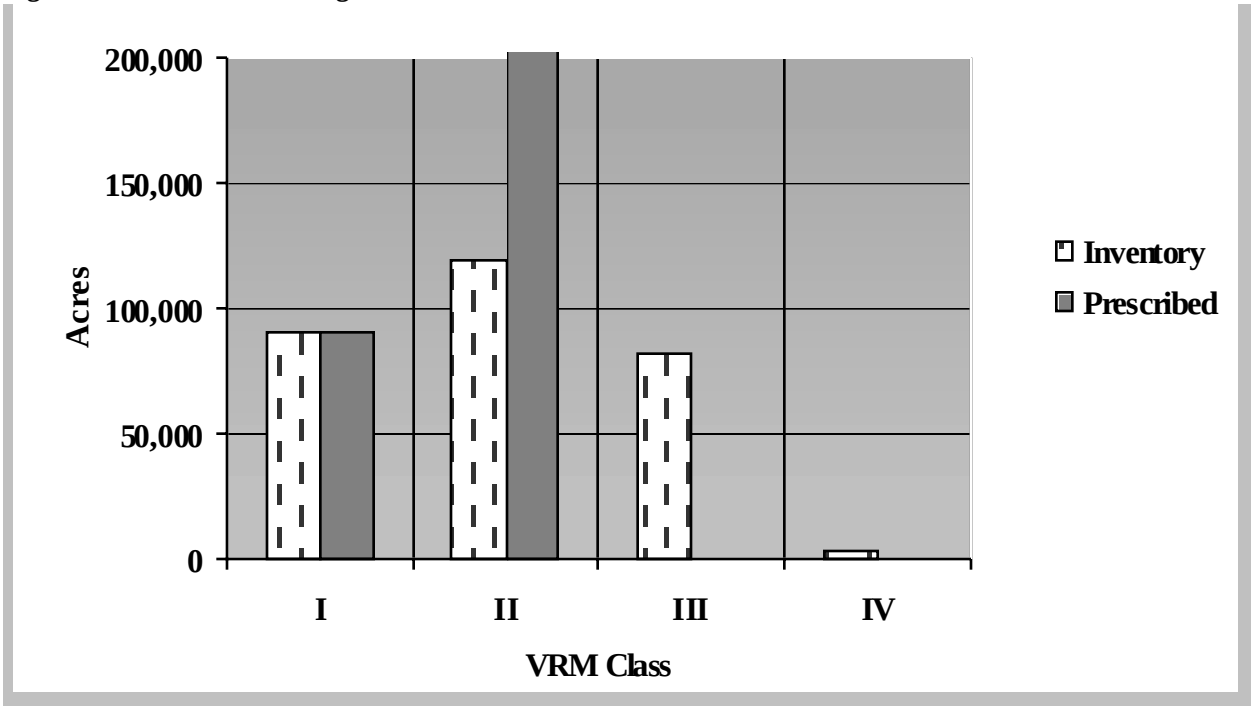
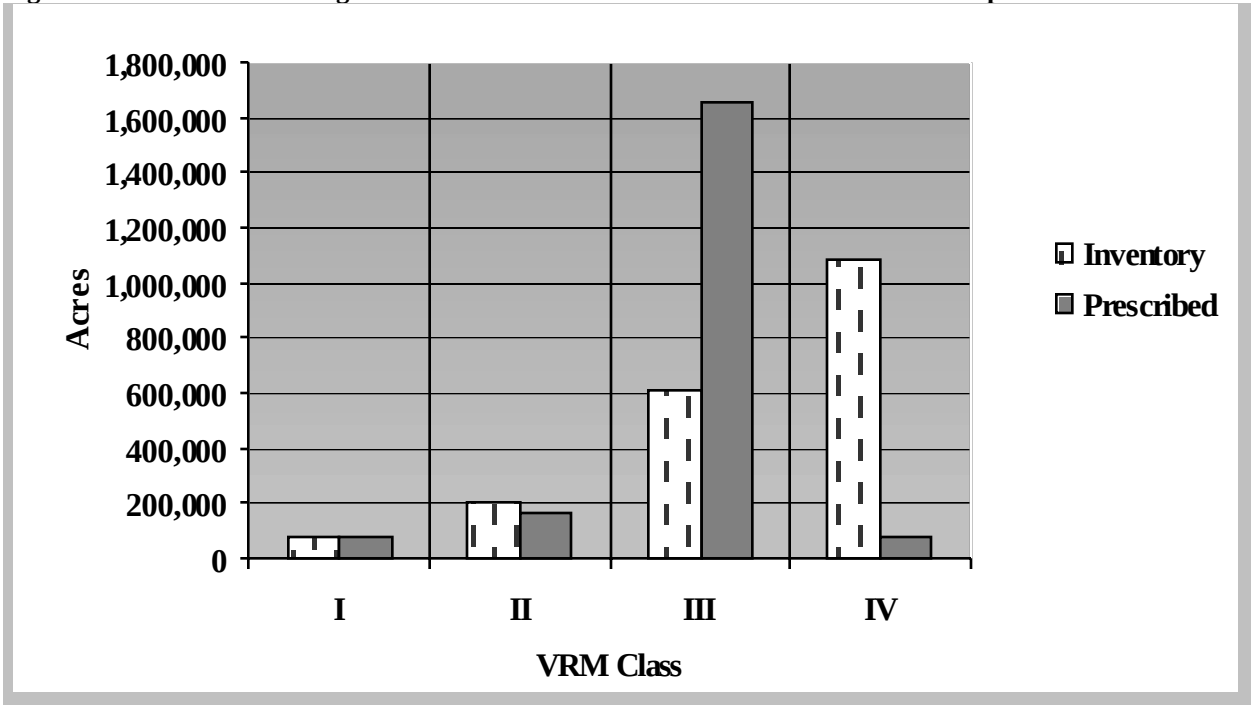


Figure 4.11: VRM Class Designations in Acres under Alternative D in Vermilion



Arizona Strip FO: The effects of a Class I standard would be the same as under Arizona Strip Alternative C. The designation of 164,932 acres to a Class II VRM standard would represent a 21 percent decrease from the inventoried Class II lands and a 71 percent decrease from Alternative A. The designation of 1,656,576 acres to a Class III VRM standard would represent a 173 percent increase over the inventoried Class III lands and a 342 percent increase from Alternative A. The designation of 72,797 acres to a Class IV standard would represent a 93-92 percent decrease from the inventoried Class IV lands and Alternative A. Figure 4.12 illustrates the discrepancies between VRM classes proposed and VRI classes.

Figure 4.12: VRM Class Designations in Acres under Alternative D in the Arizona Strip FO



Impacts from Cultural Resources

Overall impacts would be the same as those described under Alternative A

Impacts from Special Designation (Wilderness)

Impacts would essentially be the same as those described under Alternative B. However, active restoration efforts could create minor, short-term visual change, depending on the scope and magnitude of the methods used. In the long-term, successful restoration efforts would not be noticeable.

Impacts from Livestock Grazing

Overall impacts would be similar to those described under Alternative A, although some improvement to visual quality would occur on 3 percent more acres that would be unavailable for livestock grazing in Parashant and 56,309 additional acres that would receive seasonal restrictions. In Vermilion, impacts would be the same as under Alternative C due to the same number of acres unavailable to grazing and similar number of acres covered by seasonal restrictions. However, in the Arizona Strip FO, there would be 5 percent more acres that would receive seasonal restrictions when compared to Alternative A.

Impacts from Recreation and Visitor Services

General impacts and those stemming from recreation monitoring actions would be the same as those described under Alternative A. Impacts from recreation marketing actions would be the same as those described under Alternative B. Impacts from recreation management actions and recreation administration would be the same as described under Alternative C, with the exception that impacts from allowing the commercial use of horses and pack stock in Paria Canyon would be similar to that described under Alternative A. In Parashant, impacts from SRMAs/SMAs would be the same as described under Alternative C. In Vermilion, the proposed SRMAs would contain slightly less area as the SRMAs proposed under Alternative A, thus resulting in similar impacts as described under Alternative A. In the Arizona Strip FO, proposed SRMAs would cover nearly one and a half times the area compared to Alternative A, which would result in impacts that are more widespread.

Impacts from Lands and Realty

Impacts would essentially be the same as those described under Alternative A for Parashant and the Arizona Strip FO, but similar to Alternative B for Vermilion.

Alternative E: Proposed Plan

Impacts from Travel Management/Transportation Facilities

Impacts from OHV closed area designations and prohibitions on new road construction would be similar to those described under Alternative A. Impacts from management of TMAs would be similar to those described under Alternative C as TMA designations proposed are only within a 1 percent difference in all three planning areas.

Under Alternative E, impacts from the combined total of roads open to the public and to administrative use in the Monuments would be similar to those described under Alternative C due to similar number of miles. Impacts from route closures and rehabilitation would be similar to those described under Alternative B, although not as intense and widespread as less than half the miles of routes in Parashant and 37 percent in Vermilion would be closed under Alternative E compared to Alternative B. Impacts from rerouting and monitoring the creation of unauthorized

routes and closing those found would be the same as under Alternative A. Impacts from intermittent dust and to night sky conditions would also be similar to those described under Alternative A, although reduced due to a reduction in roads open to the public compared to Alternative A. This reduction would also result in negligible to minor, long-term impacts to public opportunities to view some scenic resources if critical viewing routes are closed. The impacts from restricting travel to designated routes and existing and new road material sites would be similar those described under Alternative A. Impacts from route maintenance/improvement actions would be the similar to those described under Alternative D.

Impacts in the Arizona Strip FO from implementing Alternative D would differ from the Monuments in the following ways:

- The effects of the designated Travel Management system for the Ferry Swale Sub-regions would occur on 49 miles of open public roads, 5 miles of administrative use only roads, and 0 miles of open for non-motorized/non-mechanized use; the combined total of 54 miles perpetuate the types of visual influences already described under Alternative A, on less than 1 percent fewer miles.
- The visual impacts of actions related to closed routes would take place on 2 miles closed and rehabilitated routes in the Littlefield and Ferry Swale Sub-regions, or a 33 percent decrease from Alternative A.
- The impacts related to intermittent dust, night sky conditions, and viewing opportunities described under Parashant Alternative B would be similar in the Ferry Swale Sub-regions, though attributable to less than 1 percent fewer open public roads than Alternative A.
- The effects of Open OHV area designations would be the same as under Alternative D and the impacts of motorized speed events would be the same as under Alternative C.
- The effects of a 'preliminary route network' pending future route designation decisions for applicable sub-region would be similar to Alternative B.

Impacts from Wilderness Characteristics

Overall impacts would be similar to those described under Alternative B, albeit less widespread because complementary management relating to wilderness characteristics under Alternative E would occur on 49 percent less acres in Parashant and 63 percent less acres in Vermilion. There would be 24 percent less acres in Arizona Strip FO under Alternative E than under Alternative B.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative D.

Impacts from Air, Water, and Soil

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

Impacts from Fish and Wildlife

Overall impacts would be most similar to those described under Alternative C.

Impacts from Special Status Species

Impacts would essentially be the same as those described under Alternative A.

Impacts from Visual Resources

Impacts from future Congressional designations of wilderness or wild and scenic rivers would be the same as described under Alternative A. The effects of prohibiting activities that could not be mitigated to achieve long-term visual objective(s) and the use of the VRM contrast rating process would be the same as described under Alternative A. Impacts from research/restoration actions that would be allowed to exceed VRM objectives would have the same short-term effects described under Alternative B. Impacts to night sky conditions would essentially be the same as those described under Alternative C.

Impacts from VRM Class designations in Parashant would be essentially the same as those described under Alternative C, except that they would apply to 103,467 fewer VRM Class I acres and 198,724 more VRM Class II acres. Impacts from VRM Class designations in Vermilion under Alternative E would be the same as those described under Alternative D due to the same allocations. In the Arizona Strip FO, the effects of a Class I standard would be the same as under Alternative C, while the effects of a Class IV standard would be 7 percent less as under Arizona Strip Alternative D. The designation of 368,032 acres to a Class II VRM standard would represent a 76 percent increase from the inventoried Class II lands and a 36 percent decrease from Alternative A. The designation of 1,459,374 acres to a Class III VRM standard would represent a 141 percent increase over the inventoried Class III lands and a 289 percent increase from Alternative A.

Impacts from Cultural Resources

Overall impacts would be the same as those described under Alternative A

Impacts from Special Designation (Wilderness)

Impacts would be the same as those described under Alternative D.

Impacts from Livestock Grazing

Overall impacts would be the similar to those described under Alternative C in Parashant, Alternative B in Vermilion, and Alternative A in the Arizona Strip FO.

Impacts from Recreation and Visitor Services/Interpretation and Environmental Education

General impacts would be the same as described under Alternative A, while impacts from recreation marketing actions would be the same as described under Alternative B. Impacts from recreation management, monitoring, and administration actions would be similar to that described under Alternative C, while impacts from SRMAs/SMAs would be the same as described under Alternative D.

Impacts from Lands and Realty

Impacts would essentially be the same as those described under Alternative A for Parashant and the Arizona Strip FO, but similar to Alternative B for Vermilion.

Cumulative Impacts

The geographic area for analysis of cumulative impacts to visual resources is northern Arizona, southwestern Utah, and southeastern Nevada. Over time, continued population growth of the large and small communities in this area would erode natural night sky conditions in the Planning Area. During the life of the Plan, the development of large blocks of Arizona State Trust lands for residential, commercial, urban, and other community expansion purposes would shift much of the recreation use that currently takes place on those lands to adjacent public lands. Such a shift would produce an increase in the creation of illegal routes and fugitive dust that would noticeably change the visual character of affected public lands.

The growing need to decrease the potential for catastrophic fire in the region through mechanical treatments aimed at reducing fuel loads would gradually alter landscapes where treatments are conducted. Smoke from prescribed fires used for the same purpose would sporadically affect the quality of viewsheds and interfere with the public's viewing of scenery. The potential for noxious weed invasions in the region to change existing landscape form, texture, and color over large areas in a relatively short time would continue to increase.

Extended drought conditions combined with construction activities (related to urban growth) and increased use of dirt roads in the region (related to the growing numbers of visitors) would contribute to more frequent and prolonged periods of fugitive dust, which would affect the quality of visual resources. Conversely, diligent application of Standards for Rangeland Health, the maintenance of Vital Sign resources on NPS lands, reclamation practices, restoration projects, and the progression toward achieving DFCs for vegetation management would noticeably reduce the potential for fine soil particles to become airborne. Such practices would, if successful, improve scenic quality on sites that historically have been compromised.

Continued application of visual resource design principles for permitted projects, activities, and uses on public lands would do much to maintain visual resources within the Planning Area. A shift toward renewed uranium exploration and extraction activities would create visual contrasts in non-Monument areas. As some shifting in the region occurs from agricultural-related

businesses to recreation and tourism, some landscapes would be visually enhanced by the removal of unneeded structures. However, such a shift would create other impacts to visual resources by providing for more structured recreation, accompanied by increased visitation. Management of areas such as wilderness, proposed wilderness, areas having wilderness characteristics, and various ACECs would contribute to maintaining or enhancing landscape conditions on scattered, large tracts of public land.

WILDERNESS CHARACTERISTICS

This section presents potential impacts from the proposed alternatives to areas having wilderness characteristics. Analyzed are management actions that either enhance or diminish those characteristics most often associated with wilderness (i.e., solitude, naturalness, and outstanding opportunities for primitive and unconfined recreation). In the Planning Area, these characteristics are primarily influenced by the number and proximity of motorized travel corridors, the volume and type of traffic on those corridors, and the quantity and type of recreational users. Noise from motorized travel can degrade solitude, motorized intrusions can cause surface disturbances that impact naturalness, and both types of impacts can reduce opportunities for primitive and unconfined recreation. To a lesser extent, range and wildlife management projects can affect areas with wilderness characteristics. These impacts normally come from vegetation treatments and the installation, maintenance, and use of range/wildlife catchments and wildlife "drinkers" (i.e., manmade water sources).

The plan alternatives provide a wide range of acreage combinations that are proposed for maintaining wilderness characteristics (refer to Table 2.10). In order to provide an appropriate array of management alternatives for wilderness characteristics, an objective scoring criteria (Appendix: 3.D) was developed to prioritize areas that, early in the planning process, had been assessed and found to have all three wilderness characteristics (i.e., solitude, naturalness, and outstanding opportunities for primitive and unconfined recreation). Each area that had been assessed and found to have the three characteristics was scored on three criteria: the value of the characteristics (e.g., condition, uniqueness, relevance, and importance); the need (i.e., trend and risk) for that particular area, given existing and future tendencies; and whether the area was practical to manage for maintenance of the wilderness characteristics.

Methods and Assumptions

The analysis of potential impacts to wilderness characteristics is based on visitor use reporting statistics from the Arizona Strip FO and the Recreation Management Information System (RMIS), which provide information on the number and types of recreational use within areas containing wilderness characteristics, and on the wilderness characteristics assessments, which were conducted between April 2002 and May 2004. The assessments provide boundary data, as well as narrative information on type and quality of areas with wilderness characteristics. Spatial/GIS information was also used in this analysis, such as wildlife habitat boundaries, range and wildlife developments, wilderness characteristic boundaries, transportation inventory,

transportation designations, ecological zones, vegetation types, and known historical/cultural sites. In the absence of data, analyses were based on the knowledge base of local recreation/wilderness planners. All areas referenced as containing wilderness characteristics have been assessed and shown to possess all three wilderness characteristics.

Impacts are quantified where possible. In the absence of quantifiable data, professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. Impacts to each of the three wilderness characteristics can be quite different. For instance, naturalness, solitude, and opportunities for primitive/unconfined recreation can all be impacted by surface disturbing activities; but only solitude and opportunities for primitive/unconfined recreation can be impacted when no surface disturbance is present. Despite these differences, the intensities of impacts to each wilderness characteristic can be described using the following guidance:

Negligible: The impact is at the lower level of detection; there would be no measurable change.

Minor: The impact is slight but detectable; there would be a small change.

Moderate: The impact is readily apparent; there would be a measurable change that could result in a small but permanent change.

Major: The impact is severe; there would be a highly noticeable, long-term, or permanent measurable change.

The following assumptions regarding the future management of lands with wilderness characteristics are made:

- All guidelines for the maintenance of wilderness characteristics, as identified in this document would be followed, to the extent allowed by existing budget and available personnel.

- Any new surface disturbing activities proposed would be subject to NEPA analysis. Activities proposed that would not initially meet wilderness characteristic objectives for the area would be mitigated to the extent needed to meet the objectives.

Impacts to Wilderness Characteristics

Impacts to areas having wilderness characteristics would result from actions proposed by the following resource management programs:

- Travel Management
- Wilderness Characteristics
- Vegetation Management
- Fish and Wildlife
- Special Status Species
- Visual Resources
- Cultural Resources
- Livestock Grazing
- Recreation
- Lands and Realty

Alternative A: No Action

Under Alternative A, no areas identified as having wilderness characteristics would exist. The current management plan (No Action) makes no provision for maintaining wilderness characteristics because it (the 1992 Arizona Strip RMP) predates the agency policy that allowed identification of wilderness characteristics. Therefore, it must be noted that Alternative A describes impacts only to the lands assessed and found to have wilderness characteristics and the potential effects from the absence of prescriptively maintaining these areas. Alternatives B through E evaluate the effects of plan alternatives on both the lands with wilderness characteristics and the prescriptively managed acreage for each alternative.

<u>Impacts from Travel Management</u>

Under Alternative A, no routes would be closed in the Planning Area. In addition, 637 miles of routes in Parashant, 280 miles in Vermilion, and 430 miles in the Arizona Strip FO that run parallel to or are located within the lands with wilderness characteristics would be potentially open to motorized and mechanized vehicle use by the public. These routes could have a moderate impact on the lands with wilderness characteristics, as vehicle traffic could degrade solitude, naturalness, and opportunities for primitive/unconfined recreation. The effects would be direct and long-term. While the remote nature of much of the Planning Area would forestall these effects in the short-term, over time there could be a general eroding of the quality of such characteristics.

The majority of the lands with wilderness characteristics in Vermilion are on the Paria Plateau, with the remainder found in the Ferry Swale area. Both areas consist of rolling, sandy terrain, and quite often, a route or road defines the edge of the lands with wilderness characteristics. Because of the deep sand throughout the area, these routes are poor impediments to motorized

intrusion, particularly from OHV traffic. This vulnerability places the lands with wilderness characteristics in these areas at a higher risk for the impacts described above.

Impacts from Wilderness Characteristics

Field assessments conducted as part of the planning process determined that the lands with wilderness characteristics in the Planning Area are as follows: 440,899 acres in Parashant, 97,380 acres in Vermilion, and 158,033 acres in the Arizona Strip FO. As previously stated, under Alternative A, none of these wilderness characteristics areas would be maintained. Therefore, no proactive management to maintain wilderness characteristics would be undertaken, which would allow all of the lands with wilderness characteristics to be affected by other resource impacts as identified throughout this section. Alternative A, therefore, proactively maintains the least (none) amount of the lands with wilderness characteristics among the alternatives.

Impacts from Vegetation Management

Lands with wilderness characteristics make up 42 percent of the total acreage of Parashant, 33 percent of Vermilion, and eight percent of the Arizona Strip FO. Under Alternative A, vegetation treatments could have minor to moderate, localized impacts on these lands because no prescriptive maintenance of these areas would occur. These impacts could be short-term and direct, reducing solitude, naturalness, and opportunities for primitive/unconfined recreation, depending on the type and scope of work being performed.

Impacts from Fish and Wildlife

Wildlife Habitat Improvement Projects: Twenty-two wildlife drinkers located within the lands with wilderness characteristics in Parashant would remain in place under Alternative A. . On NPS lands, four existing water features would remain as part of the cultural landscape. No such drinkers are located within the lands with wilderness characteristics in Vermilion or the Arizona Strip FO. Motorized access to the existing drinkers in Parashant would continue for maintenance purposes, which could have minor impacts on the lands with wilderness characteristics with regard to opportunities for solitude and naturalness. New drinkers and other wildlife developments could potentially be developed on BLM lands in all three planning areas. The construction and maintenance of any future wildlife developments could have minor impacts on the lands with wilderness characteristics because no prescriptive maintenance of these areas would occur. Naturalness and opportunities for solitude could be affected by the addition and motorized use of new routes and structures. However, such facilities, in so far as they would cultivate sustainable, viable wildlife populations over time, could enhance wildlife components of naturalness and opportunities for certain primitive types of recreation. Impacts would be direct, localized, and minor.

Vegetation Treatment Projects for Wildlife: Maintaining existing treatments and initiating new treatments to meet vegetation DFCs could affect the lands with wilderness characteristics because no prescriptive maintenance of these areas would occur. Solitude and naturalness could experience short-term impacts while work was being conducted. Long-term impacts would depend on the size and scope of the project.

Restoration of Native Wildlife Populations: There could be a temporary loss of solitude during release operations for bighorn sheep and other species in the lands with wilderness characteristics. These impacts would be minor and localized and would be offset by enhanced opportunities for wildlife viewing in the long term.

Impacts from Special Status Species

Under Alternative A, special status species management actions for fire suppression, grazing, species reintroduction, vegetation management, and recreation could all impact the lands with wilderness characteristics depending on the type and scope of the project proposed. In order to protect special status species, such actions generally rely on minimum surface disturbance, which would result in direct, localized, and negligible to minor impacts to the lands with wilderness characteristics.

Impacts from Visual Resources

In Parashant, VRM Class III or IV designations would overlap 229,927 acres of the lands with wilderness characteristics, while VRM Classes I or II designations would overlap 204,653 acres. In Arizona Strip FO, VRM Class III or IV designations would overlap 70,107 acres of the lands with wilderness characteristics, while VRM Classes I or II designations would overlap 87,924 acres. VRM Class III and IV would allow for greater landscape modification, via projects such as vegetation treatments, communications towers, and range developments, than VRM Class I and II. This places approximately half the lands with wilderness characteristics in Parashant and the Arizona Strip FO at greater risk of diminished naturalness or opportunities for solitude and primitive/unconfined recreation because no prescriptive maintenance of these areas would occur. Impacts would be direct, long term and, depending on projects proposed, could range from minor to major, with potential to effectively eliminate wilderness characteristics in some areas.

VRM Class I or II designations would overlap all of the lands with wilderness characteristics in Vermilion (97,380 acres) under Alternative A. VRM Class I and II would be aimed at greater preservation or retention of existing landscape character than VRM Class III and IV. In mitigating or restricting landscape-altering developments or projects, management of VRM Class I and II designations could indirectly contribute to sustaining the wilderness characteristics of naturalness and opportunities for solitude and primitive/unconfined recreation. For those projects that would be allowed in VRM Class I or II designations, the impacts to the lands with wilderness characteristics would be dependent on the type of project, but would be expected to be direct, localized, and range from negligible to minor.

Impacts from Cultural Resources

Under Alternative A, four existing public use sites are located within one-quarter mile of the lands with wilderness characteristics in Parashant. Two existing public use sites in Vermilion and five in the Arizona Strip FO are adjacent to, or fall within the lands with wilderness characteristics. Increased visitor use of cultural public use sites could indirectly impact existing opportunities for solitude in or near the lands with wilderness characteristics. However, given existing location and terrain, impacts of the existing public use sites to the lands with wilderness characteristics would be localized and negligible to minor.

Cultural field inventories proposed in Parashant could have a temporary short-term impact on existing solitude and primitive/unconfined recreation opportunities because no prescriptive maintenance of these areas would occur. There could be a longer-term effect on existing naturalness, depending on the extent of the inventories. Impacts would be direct, localized, and minor.

In the Arizona Strip FO, the existing Lost Spring Mountain, Virgin Slope, and Beaver Dam Slope ACEC designations overlap, in varying amounts, portions of the lands with wilderness characteristics. ACEC designation and its accompanying management prescriptions could indirectly contribute to sustaining the lands with wilderness characteristics.

Impacts from Livestock Grazing

The presence of livestock could affect the lands with wilderness characteristics of both opportunities for solitude and primitive/unconfined recreation as users seeking these types of experiences may choose to avoid areas where cattle are present. In general, grazing impacts to the lands with wilderness characteristics could be direct, localized, seasonal, and range from minor to moderate, depending on the number of livestock present.

Range Developments: Under Alternative A, 129 range developments in Parashant, 37 in Vermilion, and 47 in the Arizona Strip FO would remain within the lands with wilderness characteristics. In addition, there would be approximately 140 miles of livestock fence and 30 miles of pipeline in Parashant, 200 miles of livestock fence and 58 miles of pipeline in Vermilion, and 167 miles of livestock fence and 26 miles of pipeline in the Arizona Strip FO. Motorized access to a majority of these sites for construction and maintenance purposes would be allowed. Such activities and the developments themselves could have minor to moderate impacts on the lands with wilderness characteristics as they could diminish naturalness, solitude, and the opportunity for primitive/unconfined recreation in the vicinity. These impacts would be direct, localized, and depending on the development, could affect the surrounding terrain for up to one-half mile in any direction because no prescriptive maintenance of these areas would occur.

Livestock Grazing Allotments: Under Alternative A, by making all or portions of six allotments in Parashant unavailable for grazing and placing seasonal restrictions on three allotments in the Arizona Strip FO, the reduction or cessation of livestock grazing could indirectly contribute to sustaining the lands with wilderness characteristics on 61,692 acres. No allotments would be unavailable for grazing or have seasonal restrictions in Vermilion, allowing livestock grazing impacts to continue to affect the lands with wilderness characteristics as described above.

Impacts from Recreation

Restoration Projects: Restoration projects using natural processes would generally have minimal localized impacts and short-term effects on the existing lands with wilderness characteristics of naturalness and opportunities for solitude and primitive/unconfined recreation. Using natural restoration processes could have moderate to major long-term impacts on naturalness, as the ability to control invasive species would likely be ineffective. These impacts would be greatest under Alternative A when compared to the other alternatives.

Geocaching: Impacts to the naturalness component of lands with wilderness characteristics from geocaching could range from negligible soil disturbance in the area immediately surrounding a geocache site, to OHV and four-wheel drive impacts from enthusiasts trying to get as close as possible to a site. In general, these impacts would be direct, localized, and minor. Moderate impacts would be possible at more popular sites, although the remoteness of the Planning Area would make this unlikely.

Signing and Facilities: Minor new facilities (e.g., toilets, information kiosks, directional signs) placed at trailheads or higher-use areas could indirectly contribute to sustaining the lands with wilderness characteristics by providing visitor information on “Leave No Trace” ethics and area-specific rules and regulations that would propagate better-informed, less-impacting visitors.

Visitor Limits and Regulations: Establishing visitor limits, supplemental rules, or restrictions when monitoring shows a trend towards unacceptable change could indirectly contribute to sustaining lands with wilderness characteristics. However, such practices would be based on waiting until areas display degraded conditions and would not allow the flexibility to manipulate use levels based on changing social and/or resource conditions.

Impacts from Lands and Realty

Retention and acquisition of surface ownership lands and sub-surface mineral estates could indirectly contribute to sustaining lands with wilderness characteristics. Such actions could prevent surface disturbing activities that may degrade wilderness characteristics.

Alternative B

Impacts from Travel Management

Under Alternative B, 876 miles of routes in Parashant and 639 miles of routes in Vermilion could potentially be closed or seasonally closed to the public. These miles are the combination of routes potentially closed to motorized and mechanized vehicle use and routes potentially open to administrative use only. Of these closures, 637 miles in Parashant and 160 miles in Vermilion run parallel to lands with wilderness characteristics. In Parashant, 606 miles of routes that would potentially be closed or seasonally closed to the public run parallel to the areas proposed under Alternative B to maintain wilderness characteristics, while all 639 miles of such routes in Vermilion would potentially be closed or seasonally closed.

Only a small number of routes have been potentially designated in the Arizona Strip FO; all other routes would remain open pending route designation. Under Alternative B, 38 miles of routes that run parallel to areas where wilderness characteristics would be maintained would potentially be closed.

Impacts in the Arizona Strip FO would be minor due to the limited number of miles potentially closed. Potential route closures in the Monuments would have a major impact on areas identified for maintaining wilderness characteristics. Potential large-scale route closures would dramatically reduce vehicle traffic, which would indirectly enhance solitude and naturalness. The effects would be direct and long term, becoming noticeable as soon as the routes were closed, and over time as potential closed routes were allowed to rehabilitate and eventually blend in with the surrounding landscape. Because of the number of route closures, any negative impacts from open routes to areas identified for maintaining wilderness characteristics would be negligible, and would be significantly less than under all other alternatives.

Under Alternative B, 411,256 acres in Parashant and 96,796 acres in Vermilion would be identified to maintain wilderness characteristics. This represents 94 percent and 100 percent, respectively, of the lands identified with wilderness characteristics. This would result in a dramatic increase in two of the three wilderness characteristics (solitude and naturalness) and a confusing result in the third characteristic (opportunities for primitive/unconfined recreation).

Proposed route closures under this alternative would create an obvious increase in opportunities for solitude. As the total number of acres restricting motorized vehicle use increases, the sights and sounds of civilization decreases, and a predictable increase in solitude occurs. Naturalness would follow a similar course, but a longer time period would be required for the natural reclamation (in the form of vegetation growth) of closed routes to take place.

Impacts to opportunities for primitive/unconfined recreation under this alternative are confusing at best, with either an increase or a decrease, depending on how those opportunities are defined. While the total acres available for primitive/unconfined recreation would increase dramatically,

the accessibility of a large number of those acres to the general public would decrease. This is because proposed route closures would effectively move many access points further away from the "core" primitive settings that visitors typically find the most interesting and enjoyable. While these areas—mostly cliffs, ridges, and canyons—would still be available for primitive pursuits, a longer hike or ride would be required to access them. And in some cases, the lack of water in the desert climate would effectively render these areas inaccessible.

Impacts from Wilderness Characteristics

Under Alternative B, 411,256 acres in Parashant and 96,796 acres in Vermilion would be identified to maintain wilderness characteristics. This encompasses 94 percent and 100 percent, respectively, of lands identified with wilderness characteristics, which represents the greatest commitment to active management of wilderness characteristics among the alternatives.

In the Arizona Strip FO, 46,135 acres would be identified to maintain wilderness characteristics. However, six ACECs proposed for the protection of cultural and wildlife resources have overlapping acreage with wilderness characteristics. Because ACEC management would include maintenance of wilderness characteristics, no further identification for maintaining wilderness characteristics was necessary. As a result, the commitment to maintain wilderness characteristics within the subject ACECs was not reflected in the total acres of lands identified for the maintenance of wilderness characteristics in this alternative. Even so, Alternative B identifies the largest area to maintain wilderness characteristics among the alternatives for the entire Planning Area.

Impacts from Vegetation Management

Under Alternative B, restoration efforts in all ecological zones would be minimal and vegetation treatments would be limited. Any vegetation treatment in areas identified to maintain wilderness characteristics would have minor, localized impacts only. Recreational users could experience direct, short-term, minor impacts to solitude while the work was being conducted. Naturalness could also experience a similar level of impacts, depending on the type and scope of work.

Impacts from Fish and Wildlife

Impacts from wildlife habitat improvement projects, vegetation treatment projects, and restoration of native wildlife populations would be the same as described under Alternative A for lands with wilderness characteristics. However, for areas identified to maintain wilderness characteristics under Alternative B, the active management of these areas would contribute to greater mitigation of projects that could hinder or prevent the maintenance of wilderness characteristics.

Impacts from Special Status Species

Impacts would be the same as described under Alternative A for lands with wilderness characteristics. However, for areas identified to maintain wilderness characteristics under Alternative B, the active management of these areas would contribute to greater mitigation of projects that could hinder or prevent the maintenance of wilderness characteristics.

Impacts from Visual Resources

The types of impacts would be similar to those described under Alternative A. However, VRM Class I or II designations would overlap nearly all areas in Parashant and Vermilion and the majority of areas in Arizona Strip FO that would be maintained with wilderness characteristics. The effects of the VRM designations, in tandem with the direct, active management of a wilderness characteristics areas versus allowing the indirect contribution of VRM designations to sustain the lands with wilderness characteristics would contribute to a greater likelihood of maintaining wilderness characteristics compared to Alternative A.

Impacts from visual resources to wilderness characteristics would be the same as described under Alternative A for the lands with wilderness characteristics that are not proposed for maintenance under Alternative B.

Impacts from Cultural Resources

Overall impacts from public use site designations would be similar to those described under Alternative A, with the exception that one additional public use site in Parashant would be located one-quarter mile from lands with wilderness characteristics. While impacts from cultural resource surveys would be similar to those described under Alternative A, active management of areas identified to maintain wilderness characteristics under Alternative B would contribute to greater mitigation of projects that could hinder or prevent the maintenance of wilderness characteristics.

Instead of being identified to maintain wilderness characteristics, some lands with wilderness characteristics in the Arizona Strip FO that overlap ACECs would be directly included in the ACECs as components of their relevance and importance. The ensuing proactive management of such ACECs would impact wilderness characteristics to a moderate degree by ensuring the maintenance of their DFCs. Impacts from such ACEC/wilderness characteristics combinations would be greatest under Alternative B compared to the other alternatives.

Impacts from Livestock Grazing

Overall impacts from livestock grazing and range developments would be the same as described under Alternative A for the lands with wilderness characteristics. However, for areas identified for maintaining wilderness characteristics under Alternative B, the active management of these

areas would contribute to greater mitigation of projects that could hinder or prevent the maintenance of wilderness characteristics.

Livestock Grazing Allotments: Under Alternative B in Parashant, making entire allotments unavailable for grazing would eliminate livestock grazing impacts on 77,260 acres and partial/seasonal restrictions would reduce impacts on 13,681 acres where wilderness characteristics would be maintained. The prescriptive maintenance of wilderness characteristics under Alternative B would directly contribute to greater mitigation of the residual effects of grazing practices on wilderness characteristics than would Alternative A, under which no lands with wilderness characteristics would be actively maintained.

For those lands with wilderness characteristics that would not be prescriptively maintained under Alternative B, impacts from livestock grazing in Vermilion would be the same as those described under Alternative A.

In the Arizona Strip FO under Alternative B, seven allotments would be subject to seasonal restrictions, none of which overlaps areas identified to maintain wilderness characteristics. However, the seasonal restrictions would contribute indirectly to sustaining 32,985 acres of lands with wilderness characteristics, which is 7,561 more acres than under Alternative A.

Impacts from Recreation

Impacts from restoration projects and signing and facilities would be the same as described under Alternative A for the lands with wilderness characteristics. However, for areas identified for maintaining wilderness characteristics under Alternative B, the active management of these areas would contribute to greater mitigation of projects that could hinder or prevent the maintenance of wilderness characteristics.

Geocaching: Removing geocache sites if impacts to resources were observed would have a positive impact on areas identified for maintaining wilderness characteristics as it would reduce or eliminate many of the impacts often associated with geocaching as described under Alternative A. The reduction in impacts would be direct and localized, but would require monitoring to ensure that improvements had long-term effects.

Recreation Marketing Actions: The production of maps, brochures, and other information regarding recreation opportunities would have a positive, moderate, and indirect impact on areas where wilderness characteristics would be maintained because such publications would allow the BLM to educate potential users about specific rules, regulations, and guidelines. The dissemination of such information could also increase user safety in these areas. Such promotional efforts, however, could also increase the number of users and thus affect solitude. Impacts would be direct and could range from minor to moderate.

Visitor Limits and Regulations: Establishing mandatory carrying capacity limits in intensive use areas would reduce or maintain the number of users, which would help maintain solitude and naturalness in areas with wilderness characteristics. However, positive impacts would be limited as such practices would be based on waiting until areas displayed degraded conditions and would not allow the flexibility to manipulate use levels based on changing social and/or resource conditions.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A for the lands with wilderness characteristics. However, for areas identified for maintaining wilderness characteristics under Alternative B, the active management of these areas would contribute to greater mitigation of projects that could hinder or prevent the maintenance of wilderness characteristics.

Alternative C

Impacts from Travel Management

Under Alternative C, 550 miles of routes in Parashant and 218 miles of routes in Vermilion could potentially be closed or seasonally closed to the public (miles are the combination of routes potentially closed to motorized and mechanized vehicle use and routes potentially open to administrative use only.) In Parashant, 121 miles of these routes and 83 miles of such routes in Vermilion would run parallel to or are within lands with wilderness characteristics. The areas proposed under Alternative C to maintain wilderness characteristics. These routes could have a minor impact on the lands with wilderness characteristics, as vehicle traffic could degrade solitude.

Potential route closures would have a minor to moderate impact on areas identified to maintain wilderness characteristics. Such closures would reduce vehicle traffic, enhancing solitude and naturalness. The effects would be direct and long-term, becoming noticeable as soon as the routes were closed, and over time as closed routes were allowed to rehabilitate and eventually blend in with the surrounding landscape. Potential administrative use only and seasonal closures would benefit solitude, but have little impact on naturalness because roads would continue to be visible. Because the number of potential route closures in this alternative is significantly less than under Alternative B, negative impacts to areas identified to maintain wilderness characteristics would be more widespread. This could be exacerbated in Vermilion by the number of routes that are cherry-stemmed within areas identified to maintain wilderness characteristics. However, since the areas affected are quite remote and any routes in proximity receive light traffic only, including the cherry-stemmed routes in Vermilion, impacts to naturalness and solitude would be minor.

Under Alternative C in the Monuments, potentially closing routes to public motorized and mechanized use would increase the total area available for primitive recreational pursuits.

However, unlike Alternative B where potential route closures and rehabilitation of such routes may render many areas impractical to visit using non-motorized means, most access routes, though limited to administrative motorized uses, would be preserved under Alternative C, thus protecting recreational opportunities in the primitive "core" areas.

Pending route designation, impacts in the Arizona Strip FO would be similar to those described under Alternative B.

Impacts from Wilderness Characteristics

Under Alternative C, 226,394 acres in Parashant and 40,345 acres in Vermilion would be identified to maintain wilderness characteristics. This represents 52 percent and 42 percent, respectively, of the lands with wilderness characteristics, which is considerably less than under Alternative B. In the Arizona Strip FO, 77,575 acres would be identified to maintain wilderness characteristics. While this is a greater acreage than proposed under Alternative B, the number and size of proposed cultural and wildlife ACECs that could provide the opportunity for overlapping, co-lateral management would be significantly reduced. As a result, Alternative C actually provides a smaller total acreage committed to maintenance of wilderness characteristics than Alternative B, but more than Alternative D.

Impacts from Vegetation Management

Under this alternative, restoration efforts would have a larger scope and could involve a wider range of restoration tools than under Alternative B. Individual impacts from restoration treatments would be similar to Alternative B, but the number and size of treatments would likely increase. Impacts to solitude, naturalness, and opportunities for primitive/unconfined recreation could range from minor to moderate and be short term, direct, and localized.

Impacts from Fish and Wildlife

Impacts from wildlife habitat improvement projects, vegetation treatment projects, and restoration of native wildlife populations would be the same as described under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Visual Resources

Under Alternative C in Parashant, 173,861 acres of areas with wilderness characteristics in the Monument would be designated VRM Class I or II. Because these designations would be aimed at greater preservation or retention of existing landscape character, most developments/ disturbances that could affect solitude, naturalness, and primitive/unconfined recreation would be

mitigated or not allowed. The remaining 52,391 acres of lands with wilderness characteristics would lay within lands designated as VRM Class III, which allows for greater landscape modification. This would risk the possible loss of solitude, naturalness, or opportunities for primitive/unconfined recreation in the lands with wilderness characteristics. Impacts would be direct, localized, and range from minor to moderate, depending on the type of project.

Impacts in Vermilion and Arizona Strip FO would be the same as described under Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B.

Impacts from Livestock Grazing

Overall impacts from livestock grazing and impacts from range developments would be the same as described under Alternative B.

Livestock Grazing Allotments: Under Alternative C in Parashant, seven allotments would be made fully, partially, or seasonally unavailable to grazing. On lands identified to maintain wilderness characteristics under Alternative C, making lands unavailable to grazing would eliminate impacts on 36,428 acres (40,833 less acres than under Alternative B), while partial/seasonal restrictions would reduce impacts on 13,476 acres (205 less acres than under Alternative B).

Impacts from livestock grazing in Vermilion and the Arizona Strip FO would be the same or similar to those described under Alternative B. In the Arizona Strip FO impacts from livestock grazing would be similar to Alternative B.

Impacts from Recreation

Impacts from signing and facilities to lands with wilderness characteristics would be the same as described under Alternative A. However, for areas identified to maintain wilderness characteristics under Alternative C, the active management of these areas would contribute to greater mitigation of projects that could hinder or prevent the maintenance of wilderness characteristics. Impacts from geocaching, recreation marketing actions, and visitor use reporting would be the same as described under Alternative B.

Restoration Projects: Active restoration projects would have a localized impact and a generally short-term effect on solitude, naturalness, and primitive/unconfined recreation, depending on the scope of the project. Long-term benefits would be realized by active restoration. Having a full suite of restoration tools would allow an aggressive approach to controlling invasive species in areas identified to maintain wilderness characteristics.

Visitor Limits and Regulations: Using an LAC framework in intensive use areas would have a positive impact on areas identified to maintain wilderness characteristics. The establishment of acceptable resource, social, and managerial settings would provide an optimal balance between the demand for wilderness use and maintenance of wilderness characteristics. These impacts would be indirect and long term.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative B.

Alternative D

Impacts from Travel Management

Under Alternative D, 427 miles of routes in Parashant and 195 miles of routes in Vermilion could potentially be closed or seasonally closed to the public (miles are the combination of routes potentially closed to motorized and mechanized vehicle use and routes potentially open to administrative use only). Of these closures, 105 miles in Parashant and 53 miles in Vermilion run parallel to or are within lands with wilderness characteristics. In Parashant, 36 miles of such closures run parallel to or are within lands that would be identified to maintain wilderness characteristics under Alternative D. No lands in Vermilion would be identified to maintain wilderness characteristics under Alternative D.

These potential closures could have a minor to moderate impact on areas identified to maintain wilderness characteristics. Some impacts would be positive, as potential route closures would enhance solitude and naturalness. The effects would be direct and long term, becoming noticeable as soon as the routes were closed, and over time as closed routes were allowed to rehabilitate and eventually blend in with the surrounding landscape. However, potential administrative use only and seasonal closures would have little impacts on naturalness. Because the number of potential route closures in this alternative is significantly less than under Alternative B and slightly less than under Alternative C, impacts to areas identified to maintain wilderness characteristics would be minor to moderate as potential open routes in close proximity would degrade naturalness and solitude.

Outstanding opportunities for primitive, unconfined recreation would be reduced in Vermilion because no areas would be identified to maintain wilderness characteristics. While the total area available for primitive recreational pursuits would decrease, because of their remoteness, the primitive nature of these areas would likely continue.

Outstanding opportunities for primitive, unconfined recreation would be reduced as compared to Alternative B in Parashant and the Arizona Strip FO. With no routes within areas identified for maintaining wilderness characteristics, the total area available for primitive recreational pursuits would increase. However, unlike Alternative B where potential route closures may render many

areas impractical to visit using primitive means, all access routes under Alternative D would be preserved, maintaining opportunities to experience recreation in the primitive "core" areas.

Pending route designation, impacts in the Arizona Strip FO would be similar to those described under Alternative B.

Impacts from Wilderness Characteristics

Though no prescriptive action to maintain wilderness characteristics would be taken, outstanding opportunities for primitive, unconfined recreation on lands with wilderness character in Vermilion would be increased to a minor degree from Alternative A by the closure of 53 miles of routes in or near these areas. However, with no prescriptive maintenance of wilderness characteristics under Alternative D, opportunities for primitive and unconfined recreation could be reduced to a minor degree over time if new routes were authorized in or along the periphery of these areas.

Outstanding opportunities for primitive, unconfined recreation would be less in Parashant and the Arizona Strip FO, compared to Alternative B. With no routes within areas identified for maintaining wilderness characteristics, the total area available for primitive recreational pursuits would increase. However, unlike Alternative B where potential route closures may render many areas impractical to visit using primitive means, all access routes under Alternative D would be preserved, maintaining opportunities to experience recreation in the primitive "core" areas.

Impacts from Vegetation Management

Impacts would be the same as described under Alternative C.

Impacts from Fish and Wildlife

Impacts from wildlife habitat improvement projects, vegetation treatment projects, and restoration of native wildlife populations would be the same as described under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Visual Resources

Impacts in Parashant would be similar to those described under Alternative C based on VRM class designations, although 38,569 more acres would be designated VRM Class III and thus be subject to greater landscape modification, potentially effecting naturalness, as well as opportunities for solitude and primitive/unconfined recreation.

Impacts in Vermilion and the Arizona Strip FO would be similar to those described under Alternative A and B, respectively.

Impacts from Cultural Resources

Impacts from cultural resources would be to those described under Alternative B.

Impacts from Livestock Grazing

Overall impacts from livestock grazing and impacts from range developments would be the same as described under Alternative B.

Livestock Grazing Allotments: Impacts from livestock grazing under Alternative D would be similar to Alternative C due to seven allotments being made fully, partially, or seasonally unavailable to grazing, although grazing impacts would be eliminated or reduced on 6,951 fewer acres. Impacts in Vermilion would be the same as described under Alternative A, while impacts in the Arizona Strip FO would be the same as described under Alternative C.

Impacts from Recreation

Impacts from signing and facilities would be he same as described under Alternative A. Impacts from recreation marketing actions would be the same as described under Alternative B. Impacts from restoration projects would be the same as described under Alternative C.

Geocaching: Working with local geocachers to relocate geocache sites if, through monitoring, it was determined that resources would be at risk would have a generally positive impact on areas identified to maintain wilderness characteristics. This approach would reduce or eliminate many of the impacts often associated with geocaching. The reduction in impacts would be direct and localized, but would require monitoring to ensure that improvements had long-term benefits.

Visitor Limits and Regulations: Establishing visitor limits, supplemental rules, or restrictions on a case-by-case basis when resource and social impacts exceed acceptable limits would reduce or maintain the number of users, having a generally positive and direct impact on areas identified to maintain wilderness characteristics. However, such practices would be based on waiting until areas displayed degraded conditions and would not allow the flexibility to manipulate use levels based on changing social and/or resource conditions.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative B.

Alternative E: Proposed Plan

Impacts from Travel Management

Under Alternative E, 495 miles of routes in Parashant and 215 miles of routes in Vermilion could potentially be closed or seasonally closed to the public (miles are the combination of routes potentially closed to motorized and mechanized vehicle use and routes potentially open to administrative use only.) Of these closures, 172 miles in Parashant and 75 miles in Vermilion run parallel to or are within the lands with wilderness characteristics. Thirty-six miles of these closures in Parashant and 32 miles in Vermilion run parallel to the areas identified to maintain wilderness characteristics under Alternative E.

These potential closures could have minor to moderate impacts on areas having wilderness characteristics. The impacts would be positive as route closures would enhance solitude and naturalness. The effects would be direct and long-term, becoming noticeable as soon as the routes were closed, and over time as closed routes were allowed to rehabilitate and eventually blend in with the surrounding landscape. Routes would continue to be noticeable where they would be left open for administrative use and where they would be seasonally closed. Because the number of potential route closures in this alternative would be significantly less than under Alternative B, the potential positive impacts would not be as widespread. However, the areas that would be affected are already remote and any routes in proximity receive only light traffic; consequently, impacts to naturalness and solitude are expected to be minor.

The increase in outstanding opportunities for primitive, unconfined recreation in the Monuments would be similar to Alternative C. Pending route designation, overall impacts in the Arizona Strip FO would be similar to those described in Alternative B.

Impacts from Wilderness Characteristics

Under Alternative E, 140,949 acres in Parashant and 36,018 of Vermilion would be identified to maintain wilderness characteristics. This represents 48 percent and 38 percent, respectively, of the lands with wilderness characteristics, which is less of a commitment to maintain wilderness characteristics than Alternatives B and C, but more than Alternative D. In the Arizona Strip FO, 34,415 acres would be identified to maintain wilderness characteristics. There is one overlapping, co-lateral management ACEC designation under Alternative E in the Grama Canyon area. As a result, Alternative E actually offers slightly more areas identified to maintain wilderness characteristics compared to Alternative D, but significantly less than all other action alternatives.

Impacts from Vegetation Management

Impacts would be the same as described under Alternative C.

Impacts from Fish and Wildlife

Impacts from wildlife habitat improvement projects, vegetation treatment projects, and restoration of native wildlife populations would be the same as described under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Visual Resources

Impacts in Parashant would be the same as described under Alternative C, while impacts in Vermilion and the Arizona Strip FO would be the same as described under Alternative B.

Impacts from Cultural Resources

Impacts from public use sites would be the same as described under Alternative B. Impacts from cultural resource surveys would be the same as described under Alternative B. Impacts from ACEC designations would be the same as described under Alternative C.

Impacts from Livestock Grazing

Overall impacts from livestock grazing and impacts from range developments would be the same as described under Alternative B.

Livestock Grazing Allotments: In areas that would be identified to maintain wilderness characteristics under Alternative E, grazing impacts would be eliminated on 36,415 acres that would be made unavailable to grazing (38,845 acres less than under Alternative B, 1,987 more than under Alternative C, and 8,938 more than under Alternative D) and grazing impacts would be reduced due to partial/seasonal restrictions on 38,415 acres (24,734 acres less than under Alternative B).

Impacts from livestock grazing in Vermilion would be the same as those described under Alternative B, while impacts in the Arizona Strip FO would be similar to those described under Alternative C.

Impacts from Recreation

Impacts from recreation marketing actions and signing and facilities would be the same as described under Alternative B. Impacts from restoration projects and visitor limits and regulations would be the same as described under Alternative C. Impacts from geocaching would be the same as described under Alternative D.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative B.

Cumulative Impacts

The geographic area of analysis for cumulative impacts to wilderness characteristics is the Planning Area. Wilderness characteristics are primarily affected by the number and proximity of motorized travel corridors; the volume and type of traffic on those corridors; and the quantity and type of recreational users. To a lesser extent, range and wildlife management projects can affect areas with wilderness characteristics. These impacts normally come from vegetation treatments and the installation, maintenance, and use of range/wildlife catchments and wildlife drinkers.

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

Vegetation treatments could be conducted on lands with wilderness characteristics that are designated as VRM Class III in the Proposed Plan, which could result in potential long-term impacts to naturalness, solitude, and opportunities for primitive/unconfined recreation.

The growing need to decrease catastrophic fire potential in the region through the reduction of fuel loads by mechanical means would gradually and visibly alter landscapes where treatments are conducted, with short and long-term reductions in the quality of solitude, naturalness, and opportunities for primitive/unconfined recreation.

IMPACTS TO RESOURCE USES

VEGETATION PRODUCTS

Impacts to Vegetation Products

As discussed in Chapter 3, the sale, collection, or use of vegetative products (e.g., native seed, medicinals, landscape mulch, posts, fuel wood, Christmas trees, lumber, etc.) is limited in the

Planning Area. Under all the alternatives, the sale of vegetative products in the Monuments would generally not be authorized. The only exception is that the sale, collection, or use of vegetative material could be allowed on BLM lands in Parashant, by permit only, if associated with a research or restoration project. In general, the sale, collection, or use of vegetative materials would be authorized in the Arizona Strip FO, but would require a permit. Such items as pinyon pine seeds and dead and downed wood for campfire use (where campfires are allowed and subject to fire restrictions) could be collected throughout the Planning Area and would be excluded from the permit requirement.

Overall, since the use and demand for vegetative products is minimal throughout the Planning Area, impacts to that use/demand due to management actions proposed under all the alternatives (primarily from the vegetation resources program) would be negligible. Refer to Impacts to Cultural Resources and Impacts to Socioeconomics for details on how restrictions on the sale, collection, or use of vegetative products would affect American Indian groups and socioeconomics within and surrounding the Planning Area.

LANDS AND REALTY

This section presents potential impacts of the various planning alternatives on the lands and realty program, specifically on land tenure decisions (disposals, acquisitions, and withdrawals) and land use authorizations (ROWs, permits, and leases). See Chapter 3 for a discussion of the lands and realty program in the Planning Area.

Lands and realty actions are vulnerable to any management action that would limit or deny authorization of an ROW or permit; limit exchange, lease, or sale of a parcel to a governmental entity, qualified individual, or business entity; or limit classification of lands for resource protection or the public good. Any management action that limits or denies these land and realty actions would affect the lands and realty program and the public.

The various kinds and types of authorizations and realty actions conducted by the lands and realty program would differ by planning area. Lands and realty actions in the Monuments would be constrained by the proclamation for each Monument and the purpose, significance, and mission statements. The proclamations provide that lands and interests in lands within the boundaries of the Monuments are withdrawn from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws, including but not limited to withdrawal from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the Monument (i.e., lands could be exchanged within the Monuments for other lands within the Monuments). The proclamations also provide that lands and interests in lands within the Monuments not owned by the United States would be reserved as a part of the Monument upon acquisition by the United States.

Lands and realty actions in the Arizona Strip FO would allow the full array of potential realty actions the BLM authorizes. The lands and realty program impacts are a direct result of management actions of other resource programs. All land and realty actions are performed using an interdisciplinary approach with input from other resource programs in order to address potential resource conflicts. Site-specific NEPA analysis would be performed on all land actions.

Methods and Assumptions

To analyze the potential effects of the alternatives on the lands and realty program, information was gathered from administrative files for lands and realty actions in and adjacent to the Planning Area and from the various actions proposed by other resource programs. The analysis is also based on the professional expertise of BLM specialists at the Arizona Strip FO and the Arizona State Office, and the realty specialist's knowledge of the area.

Effects are quantified where possible. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: The effect would be barely detectable, and/or the public would not be affected.

Minor: The effect would be slight, but detectable, and/or the public might be affected.

Moderate: The effect would be readily apparent and/or the public would be affected.

Major: The effect would be severely adverse or exceptionally beneficial and/or the public would be affected.

The following assumptions regarding future lands and realty actions were made:

- **Disposals**
  1. Lands or interests in lands identified for disposal in the Arizona Strip FO could be sold or exchanged out of federal ownership.
  2. No land disposals would take place within the Monuments except for land exchanges that further the protective purposes of the Monuments.
  3. No lands have been identified for disposal within any ACECs.
  4. The identification of lands for disposal in the Arizona Strip FO does not ensure that these lands would be sold or otherwise disposed.
  5. Before any disposals occur, lands would be examined for the presence of high-value resources. Lands that contain high surface values would not be disposed of or the disposal would provide for those values to be preserved.

6. Disposal of small, isolated parcels of public land would decrease the cost of public land administration in the Arizona Strip FO and enhance efficient management of remaining public lands.
7. The disposal of small, isolated parcels would decrease conflicts between public land users and private landowners.

- **Acquisitions**
  1. Non-federal land, interests in land (including access and conservation easements), and water rights would be considered for acquisition when they are within congressionally or administratively designated areas or contain important resources (i.e., NLCS units, Monuments, ACECs, DWMAs, critical habitat, lands supporting listed species, and riparian/wetland areas, etc.).
  2. Acquisition, including direct purchase, conservation easement, donation, or exchange would only be considered when there is a willing seller and the goals and objectives of the land use plan would be furthered.

- **Land Use Authorizations**
  1. The effects of development of utility and transportation systems would be mitigated individually. Generally, this would be accomplished by consolidation of new developments along existing routes or by innovative construction techniques that disturb less land and improve reclamation success.
  2. Visitor centers for Monuments would be located outside the Monuments and in nearby communities.
  3. Requests for renewable energy generating projects would only be considered within the Arizona Strip FO and not within the Monuments.

Impacts to Lands and Realty

Impacts to the lands and realty program in the Arizona Strip FO, Parashant, and Vermilion would result from actions proposed under the following resource management programs:

- Travel Management
- Wilderness Characteristics
- Vegetation Management
- Special Status Species (Arizona Strip FO only)
- Visual Resources
- Special Designations (Vermilion and Arizona Strip FO only)
- Recreation
- Lands and Realty

Alternative A: No Action

Impacts from Travel Management

There would be negligible impacts to lands and realty from travel management under the No Action Alternative. The most motorized and mechanized routes open to the public would occur under this alternative, allowing for continued access to private and state parcels within the Planning Area.

Impacts from Wilderness Characteristics

No lands would be identified for wilderness characteristics under this alternative, which would result in no impacts to lands and realty.

Impacts from Vegetation, including Fire and Fuels Management

Wildland and non wildland fire use, appropriate management response, and prescribed fire suppression activities could potentially adversely impact ROWs (e.g., powerlines and communication sites), facilities, and adjacent non-BLM lands; however, long-term impacts could be positive due to the reduction of catastrophic fires. Post-fire rehabilitation improvements could affect adjacent non-BLM lands (e.g., reduced erosion and less chance of alien plant invasion). Impacts to lands and realty would be minor.

Impacts from Special Status Species (Arizona Strip FO only)

In the Arizona Strip FO, approximately 170 out of 25,119 acres identified for disposal are located within the Beaver Dam Slope ACEC; however, lands in the ACEC could not be sold or exchanged. As a result, the BLM's ability to support community growth and expansion would be limited, resulting in moderate impacts.

The utility corridor would remain one-mile wide, except one-half mile wide in the Ferry Swale area, and the width of the ROW across the Beaver Dam Slope would be only the width occupied by the existing powerline and a second yet un-built line. Impacts to the local and surrounding communities could be moderate because only one additional new ROW proposal within the corridor could be approved regardless of the size and type of proposed powerline.

Lands and realty would be affected in areas where no land disposal of listed species or critical habitat is allowed, especially when special status species habitat is located in an area with high exchange or sale value or with high development value. The presence of special status species may preclude the issuance of some land use authorizations and place restrictions on others. The reintroduction of endemic or non-endemic special status species may potentially impact lands and realty depending upon the species and the use restrictions and/or conservation measures applied. The mitigation requirement to fence new roads in desert tortoise habitat would

potentially be an economic burden to applicants of land use authorizations in areas that border desert tortoise habitat because of the high cost of fence materials and labor. Overall impacts to lands and realty would be moderate.

Impacts from Visual Resources

Impacts to lands and realty due to VRM designations in the Monuments would range from negligible to minor as Monument designation already limits the authorization of new ROWs or ancillary public facilities.

In the Arizona Strip FO, two-thirds of the acreage would be designated as VRM Class III or IV, which would allow for more visual modifications, including authorizations of new ROWs or ancillary public facilities, compared to VRM Class I and II. Impacts to lands and realty would be minor, slightly less than under Alternative B, but more than under Alternatives C, D, and E.

On lands open to lease and the operation of mining laws in the Arizona Strip FO, mineral exploration and development could lead to increased lands and realty actions such as ROWs (powerlines, communication sites, etc.) and facilities. In addition, the sale of mineral materials and establishment of community pits could also lead to increased lands and realty actions. Impacts to lands and realty would be minor.

The regional utility corridor across the northern portion of Arizona Strip FO crosses a variety of VRM designations, including VRM Class II, III, and IV, thus creating conflicts between use, maintenance, and any proposed additional facilities within the corridor. Impacts on lands and realty would be minor to major depending on the VRM class where the action is proposed within the ROW and the type of additional facilities that would be constructed.

Impacts from Recreation

SRMAs would continue in designated wildernesses and Little Black Mountain and Virgin River Corridor ACECs. Management of recreation activities in these SRMAs could complement other community support initiatives and may help to reduce user conflicts. Impacts to lands and realty would be minor as lands and realty actions are already restricted by the wilderness and ACEC designations.

The potential for user conflicts and safety issues with I-15 would continue due to public access issues relating to river use and rock climbing areas in the Virgin River Gorge. Recreational use of the Virgin River Gorge could impact the ability to authorize additional facilities in the same area, which would be a minor impact to lands and realty.

Impacts from Special Designations

Wild and Scenic Rivers. The wild and scenic river suitability determination of the Virgin River could affect community development because the river channel could not be altered. This would restrict the BLM's ability to support community growth and expansion through land tenure adjustments and issuing land use authorizations in the Virgin River communities area. Impacts could be minor.

National Historic Trails. Encouraging visitors to respect the rights of landowners in the NHT area, using adjacent lands to complement the protection and interpretation of the NHT, recognizing grandfathered and valid existing rights on public lands, and not compromising the viability of identified NHT sites and/or segments for future management from new land use authorizations could pose minor to moderate impacts to lands and realty, depending upon specific location.

Areas of Critical Environmental Concern. In ACECs, there would be potential impacts to lands and realty in the form of additional or increased stipulations, restrictions on ROWs, R&PP leases, and other land use authorizations. Impacts would be moderate.

Impacts from Lands and Realty

The regional utility corridor would continue to be one-mile wide, except for narrower widths in the Ferry Swale area and across the Beaver Dam Slope. Future powerlines within this corridor would be limited to one additional line. Land acquisitions and use authorizations would continue within the parameters of the Monument proclamations. Land disposals would generally only occur in the Arizona Strip FO. Impacts on lands and realty would be minor to moderate.

Alternative B

Impacts from Travel Management

Alternative B proposes roughly twice as many roads that would be closed compared to Alternative A, which would limit motorized and mechanized access. Because administrative use could still be allowed, impacts would be minor.

Since access to private and state parcels was considered during route evaluation for the Monuments and the Littlefield sub-region, impacts on motorized and mechanized access to these areas would be negligible.

Impacts from Wilderness Characteristics

The BLM would consider acquisition of private or state inholdings from willing sellers in wilderness and areas having wilderness characteristics in Arizona Strip FO, while acquisition of private or state inholdings from willing sellers would be considered on all lands in the Monuments. Thus, impacts to the lands and realty program would only occur in the Arizona Strip FO and they would be minor because of the limited amount of non-federal acreage involved.

Impacts from Vegetation, including Fire and Fuels Management

Impacts would be the same as discussed under Alternative A. In addition, construction equipment and/or vehicles from outside the Planning Area used to implement authorized projects and uses would be required to be cleaned prior to entering the Planning Area and initiating projects. Impacts to authorized land users would be minor.

Impacts from Special Status Species

Impacts would be the same as discussed under Alternative A, except that less acreage would be available for disposal. In the Arizona Strip FO, the BLM's ability to support community growth and expansion would be more limited under this alternative because of the lower number of acres identified for disposal. No lands would be identified for disposal within the Beaver Dam ACEC, which could limit community growth and expansion of the Virgin River communities near Littlefield. Impacts would be moderate.

Impacts from Visual Resources

The types of impacts would be similar to those discussed under Alternative A, negligible to minor.

The entire length of the existing utility corridor would be designated VRM Class IV, which would lessen conflicts from visual contrasts within the ROW corridor than would be experienced under Alternative A because there would be less restriction on what could be authorized.

Impacts from Special Designations

Wild and Scenic Rivers. Impacts would be the same as under Alternative A.

National Historic Trail. Impacts would be the same as under Alternative A.

Areas of Critical Environmental Concern. Impacts would be the same as under Alternative A, except that they would be more widespread as Alternative B proposes the most ACEC acreage designation than under any other alternative. Impacts would still be moderate.

Impacts from Recreation

Impacts would be the same as under Alternative A.

Impacts from Lands and Realty

In the Arizona Strip FO, the existing utility corridor beginning at Glen Canyon Dam and ending at the Arizona/Nevada border would remain one-mile wide, except in the Ferry Swale area and Beaver Dam Slope ACEC where the corridor would be ½-mile wide. Every proposed ROW within the corridor would be subject to site-specific NEPA, NHPA, and ESA compliance. Because the Beaver Dam Slope ACEC would not be restricted to only one more ROW, impacts would be minor.

Alternative C

Impacts from Travel Management

About three-quarters of the motorized and mechanized routes open to the public under Alternative A would remain open under this alternative, which is considerably more miles compared to Alternative B. Impacts would be minor.

Impacts from Wilderness Characteristics

Approximately half as many acres would be identified for wilderness characteristics in the Monuments compared to Alternative B, except in Arizona Strip FO where there would be a 68 percent increase from Alternative B. Impacts would be minor because of the limited amount of non-federal acreage involved that could potentially be purchased.

Impacts from Vegetation, including Fire and Fuels Management

Impacts would be the same as under Alternative B.

Impacts from Special Status Species

Impacts to lands and realty from the identified resource management programs would be the same as under Alternative A, except slightly less acres would be identified for disposal. The BLM's ability to support community growth and expansion would be improved over Alternative B because of the increased number of acres identified for disposal. While impacts are expected to be less than those under Alternative B, they would remain moderate.

Impacts from Visual Resources

Significant amounts of acreage would be designated VRM Class III, more than under Alternative A but less than under Alternative B. Lands and realty impacts would be minor because Class III is less restrictive.

Impacts from Special Designations

Wild and Scenic Rivers. Impacts would be the same as under Alternative A.

National Historic Trail. Impacts would be the same as under Alternative A.

Areas of Critical Environmental Concern. Impacts would be the same as under Alternative A.

Impacts from Recreation

Impacts would be the same as under Alternative A.

Impacts from Lands and Realty

The existing utility corridor would be the same as under Alternative B. Other impacts would be the same as under Alternative A.

Alternatives D and E (Proposed Plan)

Impacts from Travel Management

Less than half as many routes would be closed to motorized and mechanized public use under Alternatives D and E than under Alternative B, but approximately two times more would be closed than under Alternative A. Impacts would be minor because administrative uses could still be authorized.

Impacts from Wilderness Characteristics

Among the action alternatives, Alternatives D and E would identify the least amount of acreage for maintaining wilderness characteristics. Impacts, however, would remain minor under both alternatives due to the limited amount of non-federal acreage involved that could potentially be acquired.

Impacts from Vegetation, including Fire and Fuels Management

Impacts would be the same as under Alternative B.

Impacts from Special Status Species

Impacts would be the same as under Alternative C.

Impacts from Visual Resources

Although more acreage in Parashant would be designated VRM Class I and Class II under Alternatives D and E than under Alternative A, impacts to lands and realty would remain minor because few use authorizations would be expected in Parashant. In Vermilion, approximately the same amount of acreage would be designated VRM Class I, II, and III as under Alternative A. Impacts to lands and realty would be negligible to minor because few, if any, use authorizations would be expected in Vermilion.

In Arizona Strip FO under Alternatives D and E, impacts would be minor because more acres near communities and designated corridors would be in a less restrictive VRM Class.

Impacts from Special Designations

Wild and Scenic Rivers. Impacts would be the same as under Alternative A.

National Historic Trail. Impacts would be the same as under Alternative A.

Areas of Critical Environmental Concern. Impacts would be the same as under Alternative A due to ACECs being avoidance areas for use authorizations. However, impacts would be less widespread under Alternative D as the least amount of acreage would be proposed for ACECs.

Impacts from Recreation

Impacts would be the same as under Alternative A.

Impacts from Lands and Realty

The existing utility corridor beginning at the Glen Canyon Dam and ending at the Arizona/ Nevada border would be designated one-mile wide. Impacts would be minor as all proposed ROWs within the corridor would be subject to site-specific NEPA compliance and compliance with cultural and ESA laws. Other impacts would be the same as under Alternative A.

Cumulative Impacts

The area of analysis for cumulative effects was defined as the Planning Area and those communities and cities immediately adjacent to the Planning Area, including Mesquite, Nevada; St. George, Hildale, and Kanab, Utah; and Page, Arizona.

Cumulative impacts to lands and realty could occur through changes in the designation and development of land resources and in changes to access of the land. Under the Proposed Plan, the regional utility corridor would be one-mile wide. Future growth and development of adjacent non-federal lands is expected to result in increased requests for use authorizations and R&PP Act grants for schools, fire stations, wastewater facilities, landfills, and the like. Other ROW proposals would also be evaluated including the Lake Powell Pipeline and Fort Pearce Reservoir.

LIVESTOCK GRAZING

This section presents impacts of the alternatives on livestock grazing as determined through changes in allocations, designations, and/or resource uses. See Chapter 3 for a discussion of livestock grazing in the Planning Area.

Livestock grazing operations may be impacted by management actions that alter types and amounts of grazing permitted and the amount and type of vegetation present in livestock grazing allotments. The latter can be influenced by vegetation treatment efforts, soil stability, and watershed function. Impacts to livestock grazing operations also come from interaction with visitors, access provisions, and other management factors that limit or restrict livestock grazing in certain areas.

Methods and Assumptions

Available information was obtained through relevant literature, best management practices, standards and guidelines assessments, monitoring, existing land use plans, and consultation with the public, livestock grazing permittees, and interdisciplinary teams. Impacts were assessed using best professional judgment from BLM and NPS resource specialists. Effects are quantified where possible. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: The impact would not be detectable. Grazing operations would not be appreciably affected. Normal day-to-day livestock grazing operations would not be affected.

Minor: The impact would be detectable. The effect would be perceptible, and the action would result in a slight change in grazing operations, but the change would be localized. Normal day-to-day livestock grazing operations would not be affected, except in small, localized areas.

Moderate: The effects would be apparent, and the action would result in a limited change in grazing operations. Normal day-to-day livestock grazing operations may be restricted.

Major: The impact would be severe. The effects would be readily apparent or widespread, and the action would result in a substantial change in livestock grazing operations. Normal day-to-day livestock operations would be restricted.

The following assumptions regarding the future management of livestock grazing resources are made:

- All laws, regulations, and policies for the management livestock grazing would be followed, to the extent allowed by budget and available personnel.
- Livestock grazing would be managed to meet the BLM Arizona Standards for Rangeland Health and NPS Vital Signs.
- The type and amount of grazing use would be expected to remain approximately the same.
- Range improvements would continue to occur at current rates to reach rangeland improvement goals.
- Improvements would include the following types of projects: spring/seep development and protection; reservoirs and pits; wells; new or modified fencing; vegetation treatments; and pipelines.

Impacts to Livestock Grazing

Impacts to livestock grazing would result from actions proposed under the following resource management programs:

- Travel Management
- Wilderness Characteristics
- Vegetation and Fire and Fuels Management
- Special Status Species
- Fish and Wildlife
- Air, Water, and Soil
- Visual Resources
- Minerals (Arizona Strip FO only)
- Special Designations (ACECs; Arizona Strip FO only)
- Livestock Grazing
- Recreation
- Lands and Realty (Arizona Strip FO only)

Alternative A: No Action

Impacts from Travel Management

Under Alternative A in the Arizona Strip FO, all authorized public land users that hold a permit, license, or other authorization (including grazing permittees) would be allowed to continue to drive off-road, if necessary, in order to fulfill requirements of their permit or license in areas limited to existing roads and trails. Such travel would require specific requests and approval by the authorized officer.

Both Monument proclamations prohibit vehicle use off road except for emergency or authorized administrative purposes. Cross-country travel is a management tool used by livestock grazing operators. Eliminating the possibility of using such a tool would increase overhead costs by increasing time necessary to conduct support activities and reducing efficiency. Impacts to livestock grazing operations would range from negligible to moderate.

For all three planning areas, the most miles of roads would remain open and the least closed under Alternative A. This would facilitate livestock management by allowing continued access to livestock grazing operations. However, it is expected that visitation to the Monument would continue to grow at high rates during the life of this Plan. Easy access afforded by the most miles of open roads would allow for increased interaction of the public with livestock and livestock developments (e.g., fences, corrals, and water developments). This would increase the occurrences of livestock harassment, gates being inappropriately left open or closed, and range improvements being damaged.

Providing the greatest miles of roads under Alternative A would also facilitate dispersed visitor use, which, in tern, would diffuse impacts to livestock and related facilities instead of concentrating such impacts on particular allotments or areas. Overall, Alternative A would cause the fewest impacts to livestock grazing operations compared to the other Alternatives. Such impacts would be moderate.

Impacts from Wilderness Characteristics

No areas would be identified for wilderness characteristics under Alternative A.

Impacts from Vegetation and Fire and Fuels Management

Within the Planning Area, vegetation treatments and restoration activities, such as mechanical and chemical, including fire and fuels management, would continue to be implemented. These activities would decrease forage available for livestock use in the short term and could result in seasonal restrictions, temporary reductions, or elimination of authorized activities to protect sensitive resources and/or ensure attainment of restoration objectives. Restoration activities in

the long term would improve the watersheds and vegetation, and provide additional forage for livestock. These impacts would be moderate.

Wild fire could decrease forage available for livestock use in the short term, and would require changes in and restrictions to livestock grazing use during emergency fire rehabilitation. In the long term, forage quality and quantity available to livestock could potentially increase. Overall, these impacts would be moderate.

Treatment of noxious weeds would control and/or contain weed species proliferation, thereby maintaining forage production, diversity, and vigor in the treatment areas. Long-term impacts would range from minor to moderate.

Impacts from Air, Water, and Soil

Air, water, and soil management considerations during the implementation of the Arizona Standards for Healthy Rangelands generally insure proper vegetative conditions and that allowable uses/actions are designed to minimize erosion. These considerations could indirectly increase forage levels for livestock.

Specific grazing management practices designed to protect vegetation and soils could be required on some small, localized areas with soil erosion concerns, which could have minor impacts on some livestock operations. Normal day-to-day livestock grazing operations may be restricted on some allotments containing larger areas with soil concerns, resulting in localized moderate to major impacts to the livestock grazing operations involved.

Implementing watershed management activity plans would continue to improve the watershed conditions by increasing vegetation cover, reducing erosion, and indirectly increasing forage conditions. Implementing such plans would cause negligible to moderate short-term impacts on livestock operations as livestock use is adjusted to provide protection until treatment can become established. The long-term effect would be reduced erosion from increased vegetation and ground cover, which could result in better forage conditions for livestock.

Impacts from Fish and Wildlife

Management and restoration of native wildlife populations into their historic ranges could have negligible to minor short- and long-term impacts on livestock operations by creating conflict with space, forage use, and water. However, the two activities have mutual goals. Water developments designed to provide new water sources for wildlife in some situations increase water availability for livestock, promoting improved distribution of both livestock and wildlife.

Limiting fences to specific designs to allow wildlife movement essentially keeps livestock contained. However, wildlife passable fences are designed so larger animals can safely jump over them or smaller ones can safely pass under them, which increases the likelihood that some

livestock could also escape, resulting in increased cost of locating the animals and allows grazing to occur outside permitted areas. The need to modify existing fences to meet standards would also increase costs for livestock operators, resulting in minor impacts.

Animal damage control efforts involving removing animals known to have killed livestock could have minor to moderate impacts by reducing further predation and loss of animals.

Impacts from Special Status Species

Under Alternative A, making areas unavailable for livestock grazing, placing restrictions on season of use, reducing access, or applying other restrictions meant to protect special status species may impact livestock grazing operations through the loss of forage, increased difficulty of access, increased costs, reduced livestock numbers, and increased number of allotments made unavailable for livestock grazing. Impacts would range from minor to moderate.

Impacts from Visual Resources

Depending on the VRM class, new range improvements such as structures or vegetation treatments would be required to meet VRM class objectives. Some VRM class restrictions on range improvement design could affect functionality and cost, or prohibit the construction of improvements such as pipelines and water storage tanks necessary to properly manage or improve livestock grazing management practices. Impacts would range from negligible to moderate.

Impacts from Minerals (Arizona Strip FO only)

Historically, minerals activities have had only minor impacts on the forage available to livestock. However, any major mineral activity has the potential to increase or decrease available forage. Such impacts would be negligible to moderate, depending on the size and duration of the project. In addition to displacing cattle, mining operations also have the potential to injure or kill cattle due to increased use of roads and presence of heavy mining equipment.

Impacts from Special Designations (ACECs)

In the Arizona Strip FO, ACECs would continue to cover 127,192 acres or 6 percent of the Field Office. These designations would continue to have minor to major impacts on those allotments within ACEC boundaries as grazing operators are required to adjust their normal, day-to-day operations, such as changes in season of use, to meet specific ACEC objectives.

Impacts from Livestock Grazing

In Parashant, designating the Parashaunt Allotment as a forage reserve would complement restoration research and assist in stabilizing local livestock operations while accomplishing

resource objectives on a landscape scale. However, the 2,308 AUMs available on the Parashaunt Allotment are essentially removed from the total authorized AUMs on the Monument because using the forage reserve would require moving livestock off an existing allotment and onto the forage reserve. Impacts would be negligible to minor because the allotment would still be available through either forage reserves or reconfiguration, which would help in stabilizing livestock grazing in the area.

Impacts from Recreation

Under Alternative A, recreation activities would continue to directly impact livestock grazing operations through human disturbance, including animal displacement, livestock respiratory problems caused by airborne dust, and the injury or death of animals caused by vehicle collisions. Vandalism to range projects and leaving gates open would also have an impact on livestock grazing operations. These impacts would likely increase over the life of the Plan due to the increasing level of visitation in the Planning Area.

Overall impacts from recreation on livestock grazing would be moderate under Alternative A; less intense compared to the other alternatives that would expand recreational opportunities and place restrictions on types of uses.

In Vermilion, the River Pasture of the Lees Ferry Allotment would be unavailable for livestock grazing in order to eliminate recreationists' complaints concerning evidence and presence of livestock in the canyon. Making this area unavailable for livestock grazing would create a major impact to the livestock grazing operator involved.

Impacts from Lands and Realty (Arizona Strip FO only)

The construction of powerlines, pipelines, and other construction activities would temporarily remove forage and displace or cause injury to livestock, resulting in short-term impacts. Long-term impacts would include loss of forage where roads and facilities occur; reduced forage palatability due to dust on vegetation; increased level of human activity; and livestock control problems related to fence, gate, and cattle guard maintenance.

Permanent loss of forage would also be caused by permanent road construction and land disposals and exchanges. Most land disposals and exchanges would involve isolated tracts; therefore, the loss of forage would be minimal. Exchanges would be used to reach management objectives, such as consolidating public lands to ease management, which could benefit livestock operations in the long term.

Historically, land exchanges and acquisitions have had only minor impacts on the forage available to livestock. However, any acquisition or exchange of lands has the potential to increase or decrease forage available to livestock by making either more or less acres available

for grazing. Overall impacts to livestock grazing would be negligible to minor and normal day-to-day livestock grazing operations would not be affected, except in small, localized areas.

Alternative B

Impacts from Travel Management

Substantially fewer roads would be open under Alternative B than under any other alternative, which could complicate normal day-to-day livestock grazing operations and result in substantial changes to some operations. Impacts to the grazing permittees involved would range from moderate to major.

Alternative B also proposes the greatest miles of roads open to administrative use only. While these roads would facilitate livestock operations and help alleviate some of the impacts mentioned above, administrative routes would generally be managed at the lowest maintenance levels and frequencies and be subject to the terms of an appropriate authorization instrument, which can be complex, difficult to obtain, and is usually of short duration. As a result, some livestock grazing permittee would experience moderate to major impacts on their normal, day-to-day livestock operations.

Under Alternative B, the largest acreage of lands would be managed in the Primitive TMA, encompassing 87 percent of Parashant, 86 percent of Vermilion, and 37 percent of the Arizona Strip FO. This TMA contains range improvement projects that require routine maintenance and roads necessary for livestock grazing management, along with the need for some new projects. Increased acreage for non-motorized, non-mechanized types of recreation and decreased acreage for motorized, mechanized types of recreation would result in fewer visitor-related impacts to grazing facilities and animals.

In short, implementing Alternative B would affect normal day-to-day livestock operations by limiting the use of motorized mechanized equipment necessary for economically viable operations. Such impacts to the livestock grazing permittee could range from moderate to major.

Impacts from Wilderness Characteristics

Alternative B proposes to identify the most acres of lands with wilderness characteristics. Within Parashant, almost every allotment within the Monuments would be affected. Twelve allotments within the Arizona Strip FO would be affected. A number of facilities and access roads associated with these affected allotments are also within the areas that would be identified to maintain wilderness characteristics. Such access roads would be designated as administrative use only under Alternative B, which would generally be managed at the lowest maintenance levels and frequencies and subject to the terms of an appropriate authorization instrument, which can be complex, difficult to obtain, and is usually of short duration. In addition, it may be more

difficult to get approval to build future livestock grazing facilities in areas identified with wilderness characteristics due to added restrictions .

Implementing this alternative would affect normal day-to-day livestock operations that require the use of motorized and mechanized equipment to remain economically viable. Because of the acreage involved and restrictions on access, Alternative B would result in the most restrictive of all alternatives, resulting in potentially major impacts. Major impacts to affected livestock operations would result from the implementation of Alternative B.

Impacts from Vegetation and Fire and Fuels Management

The types of impacts would be similar to those described under Alternative A, with the exception that restoration or vegetation treatment activities would be more restrictive and use fewer tools under Alternative B. This alternative also proposes the least amount of acreage of any alternative for sagebrush and pinyon-juniper treatments within the Planning Area, which would result in the least widespread impacts among the alternatives.

Closing the Cane Springs Pasture of the Mud and Cane Allotment in Parashant would require the permittee to find an alternative holding pasture. If an alternative pasture could be found, moving livestock to it could increase expenses and/or be logistically complicated. The inability of finding an alternative pasture could force the permittee to eliminate or reduce the impacted herd, causing further economic hardships. Impacts to the specific livestock operator would be major.

Impacts from Soil, Water, and Air

Overall impacts would be similar to those described under Alternative A. Implementation of additional grazing management restrictions and practices designed to protect vegetation and soil resources could result in moderate to major impacts to livestock grazing operations.

Impacts from Fish and Wildlife

Impacts would be similar to those discussed under Alternative A, with the exception that greater emphasis would be given to priority wildlife species under Alternative B. Activities adversely affecting priority species could be modified or restricted. Habitat requirements, including the goals identified in the Fish and Wildlife and Vegetation DFCs and the Management Actions to attain these DFCs, could result in greater restrictions on livestock grazing that could affect day-to-day livestock grazing operations. Impacts to livestock grazing would be minor to moderate.

Focusing management to balance predator and prey and limiting animal damage control efforts to the offending animal could have a moderate impact on livestock operations. Overall impacts to livestock grazing from wildlife management would be moderate.

Impacts from Special Status Species

Impacts would be the same as described under Alternative A, with the following exceptions:

Under Alternative B in Parashant, a larger portion of the Mosby-Nay Allotment would be unavailable to grazing, resulting in a reduction of 516 AUMs, with seasonal restrictions placed on the remaining lands available to grazing. Overall all, only 149 AUMs would be authorized. In addition, the entire Pakoon Springs Allotment (1,282 AUMs) and the entire Pakoon Allotment with critical desert tortoise habitat (1,624 AUMs) would be unavailable to livestock grazing. These actions would result in an additional 149,338 acres not available to livestock grazing in Parashant and a reduction of 3,422 AUMs compared to Alternative A. These areas not available for livestock grazing along with additional seasonal restrictions would substantially change the day-to-day livestock operations currently occurring in the allotments involved. The resultant loss of revenue by the grazing permittees involved could reach the point that they could no longer be able to afford to stay in the livestock business. Such impacts would be moderate to major for the livestock grazing permittees involved.

In the Arizona Strip FO, allotments in critical desert tortoise habitat would not be available to livestock grazing. These allotments include most of Mesquite (Littlefield Slope Pasture only; reduced by 1,319 AUMs, Littlefield Community (Littlefield Slope Pasture only; reduced by 1,199 AUMs), all of the Beaver Dam Slope (reduced by 896 AUMs), Highway (reduced by 179 AUMs) and Mormon Well (reduced by 420 AUMs). All grazing preferences associated with these allotments, and portions thereof, would be canceled, which would result in removal of 127,267 acres from livestock grazing and total of 4,013 AUMs in the Arizona Strip FO. Additional seasonal restrictions would also occur under Alternative B on the remainder of Littlefield Community and the Mesquite Allotments, and the Cedar Wash Allotment would not be allowed ephemeral extensions. Season of use restriction without ephemeral extensions would result in the loss of opportunity to utilize forage production above permitted use when climatic conditions result in excess forage being available. Areas not available for livestock grazing and seasonal use restrictions without ephemeral extensions would result in substantial change to day-to-day livestock operations and loss of revenue to the point that the grazing permittees involved could no longer be able to afford to stay in the livestock business. Grazing permittees who are forced to turn to other means to feed their livestock when public lands become unavailable could experience substantial increases to their operations' costs, potentially to the point where remaining in the livestock business may not be practical. Livestock operations depend greatly on the use of public rangelands to sustain base herds. Most of the grazing permittees do not own or control enough private lands to support their base herd for 60 or more days without having to feed hay to their animals. Other options, such as renting private pasture, if available, would be too costly for many permittees. In addition, two consecutive dry years could effectively put some grazing lessees out of the cattle business.

Under Alterative B, Parashant and the Arizona Strip FO would experience a total reduction of 7,435 AUMs (not including State AUMs) due to the management of special status species.

Using $89.70 as the total economic value per AUM (Fletcher et. al. 2006; see Impacts to Socioeconomics), such AUM reductions would result in a loss of $666,919.50 in total economic value. Overall impacts under Alternative B to the grazing permittees involved would range from moderate to major.

Also in the Arizona Strip FO, suitable Flycatcher habitat would not be available for livestock grazing during the growing season on the Clearwater portion of the Kanab Creek and Wildland Allotments and the river portion of the Lambing Allotment. This restriction would result in slight changes to the grazing operations involved. Impacts would be localized and minor.

Under Alternative B in the Arizona Strip FO, ACEC designations for the protection of special status species would have the greatest impact to livestock operations compared to the other alternatives due to the increased size and number of ACECs. Grazing restrictions in ACECs could range from season-of-use changes to other modifications in grazing systems and permit adjustments. Most management actions aimed at reducing trampling or crushing of special status plants could affect normal, day-to-day livestock operations, and could result in the loss of opportunity to utilize forage production. Impacts would range from minor to moderate. In addition, Vegetation Habitat Management Areas for special status plants (covering three different geographic areas) that would restrict uses to protect special status plants could result in impacts to livestock that are similar to ACEC restrictions

Water developments in listed species habitats could be modified under Alternative B to minimize adverse effects to the species. This action could result in restrictions to livestock use, including changes in season of use and necessitate the moving of waters, which could change normal, day-to-day operations or result in substantial cost associated with moving waters. Impacts to the livestock grazing operator involved would range from minor to moderate.

Impacts from Visual Resources

Alternative B proposes the most acres designated as VRM Class I and II, covering nearly 100 percent of the allotments within the Monuments and placing the most restrictions on grazing. These VRM class designations would require new range improvements projects to meet certain VRM class objectives, or existing ones to be brought into conformance as need or opportunity arises. Redesigning new and existing range improvements to bring them into conformance could affect functionality and cost as well as grazing operations. This could restrict the permittees by limiting their ability to utilize perennial forage and not allowing better livestock distribution. Impacts to the grazing permittees involved could range from negligible to moderate.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be similar to those described under Alternative A.

Impacts from Special Designations (ACEC)

In the Arizona Strip FO, Alternative B proposes the most acres to be under ACEC designation compared to all other alternatives, resulting in the most widespread impacts. Compared to Alternative A, the increase would affect an additional 27 grazing allotments.

Grazing restrictions from additional ACEC acreage could range from season-of-use changes to other modifications in grazing systems and permit adjustments. Impacts would be both short and long term and range from moderate to major. These changes could affect the normal, day-to-day livestock operation, and could result in a loss of opportunity to utilize forage production, which could increase the cost of grazing operations. Impacts to grazing permittees involved would range from minor to moderate.

Impacts from Livestock Grazing

Impacts would be similar to those described under Alternative A, with the following exceptions:

Under this alternative, 1,439 AUMs would not be available on the Tuweep Allotment (Parashant and the Arizona Strip FO) for livestock grazing, but with no known resource allocation conflicts. There would be 291 AUMs unavailable for grazing in the Paria River Pasture of the Lees Ferry Allotment (Vermilion). However, since this preference was voluntarily relinquished to resolve livestock/recreation conflicts within the river corridor, impacts would be moderate. Using the $89.70 total economic value per AUM (Fletcher et. al. 2006; see Impacts to Socioeconomics), these 1,730 AUMs lost under Alternative B would result in a loss of $155,181 in total economic value.

Impacts from Recreation

Overall impacts would be the same as described under Alternative A with the following exceptions:

Impacts to livestock grazing from recreation would also be similar to those concerning areas closed to motorized access discussed under Impacts from Travel Management under this alternative. This is particularly true for SRMAs and Extensive Recreation Management Areas (ERMAs) where the areas are to be managed essentially free from evidence of human-induced restrictions and controls, and motorized use within the area would not be permitted.

Areas defined for non-motorized access contain range improvement projects, which generally require the use of roads for routine maintenance. Roads are also necessary for livestock grazing management and the potential construction of some new projects. Taken together, limiting and/or restricting access (subject to the terms of an appropriate authorization instrument) could limit the ability of livestock grazing permittees to deal with differing situations that arise during daily operations. Impacts would be readily apparent and wide spread, affecting normal day-to-

day livestock operations that require the use of motorized and mechanized equipment to remain economically viable. Impacts to livestock grazing permittees could range from moderate to major.

Over time, grazing allotments and permittees would continue to sustain further impacts from increasing recreational use throughout the Planning Area, which can increase vandalism to range projects and disturbance to livestock, resulting in minor to moderate impacts on livestock operations. More recreational use could create conflicts with livestock or livestock-associated equipment on the roads, at camping or parking locations, at livestock watering sites, and at popular recreation locations.

Impacts from Lands and Realty

Impacts would be similar to those described under Alternative A.

Alternative C

Impacts from Travel Management

Impacts from road closures and restrictions would be similar to those described under Alternative B, although slightly less intense as a few more miles of roads would be left open and fewer miles of road would be closed. Impacts would range from moderate to major, depending on the specific roads involved.

Impacts from TMA designations would also be similar to Alternative B, albeit less intense as there would be fewer acres of Primitive TMA.

Impacts from Wilderness Characteristics

Impacts would be similar to those described under Alternative B, although less widespread in the Monuments as fewer acres are proposed for maintaining wilderness characteristics and fewer allotments would be affected. Impacts in the Monuments would still be moderate. Impacts would be more widespread in the Arizona Strip FO as more acres would be identified with wilderness characteristics and more allotments would be affected. Impacts in the Arizona Strip FO would be moderate.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be similar to those discussed under Alternative B. One exception is that more acres of both sagebrush and pinyon-juniper habitats could be treated and such treatments could occur sooner when compared to Alternative B.

In Parashant, the Cane Springs riparian area would be fenced and not available for grazing, which would be more restrictive than under Alternative A but less restrictive than under Alternative B. While the Cane Springs Pasture would continue to act as a holding pasture, the permittee would be required to operate and maintain a water collection facility, which is more restricted and more costly to accomplish than if the riparian area was available to grazing. Impacts to the particular livestock operator would be moderate.

Impacts from Air, Water, and Soil

Impacts would be similar to those described under Alternative B.

Impacts from Fish and Wildlife

Impacts would be similar to those discussed under Alternative B, with the exception that four additional watchable wildlife areas would be added in Parashant, one would be created in Vermilion, and five would be added in the Arizona Strip FO. These additional watchable wildlife areas would increase visitation and potential conflicts with livestock. Impacts to grazing operations would be negligible.

Impacts from Special Status Species

Impacts would be similar to those described under Alternative A, with the following exceptions:

In Parashant, impacts from the unavailability of areas for grazing and restrictions on the Mosby-Nay Allotment would be similar to Alternative B. Impacts to that portion of the Pakoon Allotment unavailable to grazing within the Pakoon DWMA would be similar to Alternative A; however, shortening the season of use outside the DWMA would increase impacts to grazing permittees, even with possible ephemeral extensions. Expanding the area that is not available for livestock grazing on Pakoon Springs allotment would result in a loss of 840 AUMs. Impacts to the livestock operators involved would be major.

In the Arizona Strip FO, season of use and other management prescriptions consistent with achieving DFCs, as identified through the rangeland health assessment process, would be established (along with a management plan detailing specifics of grazing use) on the remaining portions of Littlefield Community and Mesquite allotments. These restrictions could result in minor to moderate impacts on the normal, day-to-day livestock grazing operations of the grazing permittees involved.

In the Cedar Wash Allotment outside desert tortoise ACECs, ephemeral extensions would be authorized when conditions outlined in Guideline 3-5 (guidelines for when to authorize grazing on designated ephemeral ranges) of the Arizona Standards for Rangeland Health are met. Using the Guidelines would result in negligible to minor, if any, impacts to the day-to-day livestock grazing operations of the permittees involved.

Under Alternative C, Parashant would experience a total reduction of 840 AUMs due to the management of special status species. Using $89.70 as the total economic value per AUM (Fletcher et. al. 2006; see Impacts to Socioeconomics), such AUM reductions would result in a loss of $75,348.00 in total economic value. Overall impacts under Alternative C to the grazing permittees involved would range from minor to major.

Impacts from Visual Resources

In Parashant and the Arizona Strip FO, impacts would be similar to those described under Alternative B for Vermilion. Impacts would also be similar to Alternative B in Parashant and the Arizona Strip FO, although impacts would be less intense as fewer acres would be designated under VRM Class I and II.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be similar to those described under Alternative A.

Impacts from Special Designations (ACECs)

The types of impacts would be similar to those discussed under Alternative A, except that they would be more widespread due to additional acres that would fall within expanded or newly designated ACECs, but not as widespread compared to Alternative B.

Impacts from Livestock Grazing

Designating the Pakoon Springs and Parashaunt Allotments (Parashant) and the Tuweep Allotment (Parashant and Arizona Strip FO) as forage reserves would complement restoration research and assist in stabilizing local livestock operations while accomplishing resource objectives on a landscape scale. However, the 608 AUMs in the Pakoon Springs Allotment, 2,308 AUMs Parashaunt Allotment, and 1,439 AUMS available on the Tuweep Allotment are essentially removed from the total authorized AUMs on the Monument, because the permittees that would use the forage reserve is in all practicality moving livestock off of his allotment onto the forage reserve. Impacts would be negligible to minor because allotments would still be available to use through either forage reserves or reconfiguration, which would help in stabilizing the livestock grazing in the area.

In Vermilion, the River Pasture of the Lees Ferry Allotment (291 AUMs) would be managed as a forage reserve for livestock grazing, with a season of use from November 15 through March 1, and would not be used more than two years in five. The AUMs would be retained by the BLM and that portion of the pasture in Glen Canyon NRA would still be utilized as part of the pasture. Impacts would be negligible to minor.

Impacts from Recreation

Impacts would be similar to those discussed under Alternative B, with the exception that the Primitive TMA would be slightly smaller with additional SRMAs and ERMAs may concentrate recreation use in some areas but would also allow more management to resolve conflicts between other uses, including livestock grazing operators.

Impacts from Lands and Realty

Impacts would be similar to those described under Alternative A.

Alternative D

Impacts from Travel Management

Under Alternative D, impacts from Primitive TMAs to livestock grazing would be similar to Alternative B, although less intense due to fewer acres under this TMA. Impacts to livestock grazing from implementing changes to roads open, roads closed, and roads open to administrative use only would be similar to Alternative B, except impacts would be less intense due to more roads open, fewer roads closed, and fewer administrative roads. Impacts would also be less intense than Alternatives C and E, but more intense than under Alternative A.

Impacts from Wilderness Characteristics

Impacts in Parashant would be similar to those described under Alternative B, although less intense as it would involve fewer acres for maintaining wilderness characteristics. Aside from Alternative A, Alternative D would have the least effect on livestock grazing among the alternatives. Impacts would be more localized and in the range of minor to moderate.

Impacts to livestock grazing in Vermilion would be the same as described under Alternative A because no acres would be identified for wilderness characteristics.

In the Arizona Strip FO, the types of impacts would be the same as described under Alternative B, but more localized due to fewer acres proposed to be maintained with wilderness characteristics. Impacts would be the same as under Alternative E due to similar acres having wilderness characteristics, which is considerably fewer acres than proposed under Alternative C, and would range from minor to moderate.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be similar to those described under Alternative B, with the exception that Alternative D would allow for treating more acres of sagebrush and pinyon-juniper sites, the most among the alternative except Alternative A. Allowing more acres to be treated provides

additional opportunities to maintain and improve watersheds and maintain or increase forage quality and quantity available to livestock in the long term. Overall impacts would be minor to moderate.

Under Alternative D, impacts from vegetation management in the Cane Springs Pasture of the Mud and Cane Allotment would be the same as under Alternative A.

Impacts from Air, Water, and Soil

Impacts would be similar to those described under Alternative B.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative C.

Impacts from Special Status Species

In Parashant, impacts from making the Mosby-Nay Allotment unavailable for grazing would be the same as described under Alternative A. Under Alternative D, the Grand Gulch Wash portion of the Pakoon Allotment would be eliminated from the DWMA and available for grazing, which would result in positive, moderate impacts for the grazing permittees. However, the season of use would be reduced, decreasing some benefit from the additional AUMs, even with the possible ephemeral extensions.

Impacts in Vermilion would be similar to those described under Alternative A. Impacts in the Arizona Strip FO would also be similar to those described under Alternative A, except that most of Mesquite (Littlefield Slope Pasture only), and Littlefield Community (Littlefield Slope Pasture only), and all of the Beaver Dam Slope, Highway, and Mormon Well grazing allotments would receive ephemeral extensions to May 15, when conditions outlined in Guideline 3-5 of the Arizona Standards for Rangeland Health are met. In addition, season of use in the Cedar Wash Allotment would increase by one month. These changes from Alternative A would result in a slight to limited change in the normal, day-to-day grazing operation by allowing the use of the additional forage, when available. Impacts to the livestock grazing operations for those permittees involved would be positive and range from minor to moderate.

Impacts from special status species decisions concerning water developments in listed species habitats would be the same as described under Alternative B. With all impacts combined, Alternative D would have the least impacts to livestock grazing among the alternatives, with the exception of Alternative A.

Impacts from Visual Resources

In Parashant, impacts from VRM Classes I and II designations would be the same as described under Alternative B, although less intense due to fewer acres designated. Impacts would also be less intense than all other alternatives except Alternative A for the same reasons.

In Vermilion, VRM Classes I and II designations would be the same as described under Alternative B, except that VRM Class I would decrease and Class II would increase. Intensity of impacts under Alternative D would be the same as under Alternatives A.

In the Arizona Strip FO, impacts from VRM Classes I and II designations would be similar to those under Alternative B, although impacts would be less intense as there would be fewer acres designated. In fact, alternative D proposes the fewest acres in the Arizona Strip FO to be designated as VRM Classes I and II, making it the least impacting of all alternatives.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be similar to those described under Alternative A

Impacts from Special Designations (ACEC)

In the Arizona Strip FO, impacts would be similar to Alternative A; however, impacts would be less widespread compared to all the alternatives due to the fewest acres proposed for ACEC designation. Alternative D would only affect 17 grazing allotments compared to 29 that would be impacted under Alternative A due to revoking the designation of the four existing ACECs and adjusting the size of the remaining ones.

Impacts from Livestock Grazing

Under Alternative D, the Pakoon Springs Allotment outside the DWMA (Parashant) and Tuweep Allotment (Parashant and Arizona Strip FO) would be re-allocated or reconfigured, which would maintain the current AUMs available for livestock grazing. This action would have negligible effects to livestock grazing; in fact, reconfiguring the allotment could be beneficial to the adjacent permittees by making their grazing system more operable.

Designating the Parashaunt Allotment (Parashant) as a forage reserve would be the same impacts as discussed under Alternative A.

In Vermilion, impacts would be similar to those discussed under Alternative C, except that the River Pasture of the Lees Ferry Allotment would be grazed from November 1 to April 15, but could only be used three out of 5 years.

Impacts from Recreation

Impacts would be similar to those described under Alternative B, except that impacts concerning SRMAs/ERMAs would be similar to Alternative C.

Impacts from Lands and Realty

Impacts would be similar to those described under Alternative A

Alternative E: Proposed Plan

Impacts from Travel Management

Impacts would be similar to those discussed under Alternative C.

Impacts from Wilderness Characteristics

In the Monuments, impacts from lands having wilderness characteristics would be most similar to those described under Alternative C, although less intense due to slightly fewer acres that would be allocated. As under Alternative C, impacts would be moderate.

In the Arizona Strip FO, impacts would be similar to those discussed under Alternative D due to similar number of acres that would be identified as having wilderness characteristics.

Impacts from Vegetation and Fire and Fuels Management:

Due to the acres of sagebrush habitat that could be treated, impacts would be the same as described under Alternative C in Parashant and the same as Alternative D in Vermilion and the Arizona Strip FO.

Under Alternative E, depending on the proposed site management plan for the Cane Springs riparian area, impacts to the livestock grazing operation could range from negligible to minor as riparian, wildlife habitat, historic and prehistoric resources, and future recreation uses are promoted or protected.

Impacts from Soil, Air, and Water

Impacts would be similar to those described under Alternative B.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative C.

Impacts from Special Status Species

In Parashant, impacts from areas being unavailable for grazing and restrictions on the Mosby-Nay Allotment would be the same as described under Alternative D. Impacts from areas being unavailable to grazing and restrictions on the Pakoon Springs Allotment and Pakoon Allotment would be the same as described under Alternative C, with the exception that the DWMA portion of the Pakoon Allotment would only be available seasonally to livestock grazing by fencing and allowing livestock seasonal access to Ed's pond, which would cause additional hardships to the grazing permittee involved. Impacts to the remainder of the Pakoon Allotment would be similar to those described under Alternative C, with the exception that ephemeral extensions would be allowed until June 1.

Impacts from Visual Resources

In the Monuments, impacts would be similar to those described under Alternative D.

In the Arizona Strip FO, impacts would be similar to those described under Alternative B, except less widespread due to fewer acres being designated as VRM Classes I and II. In fact, Alternative E would result in the greatest impacts to livestock grazing from VRM designations among the alternatives except Alternative B.

Impacts from Minerals (Arizona Strip FO only)

Impacts would be similar to those described under Alternative A

Impacts from Special Designations (ACECs)

In the Arizona Strip FO, impacts would be similar to those described under Alternative B due to the same number of allotments that would be affected. However, fewer acres would be impacted than under Alternative B, but more than under the other alternatives.

Impacts from Livestock Grazing

Impacts from operating the Pakoon Springs and Parashaunt Allotments (Parashant) and Tuweep Allotment (Parashant and Arizona Strip FO) as forage reserves would be similar to Alternative C, minus the option to reconfigure. Impacts in Vermilion would be similar to those described under Alternative B.

Impacts from Recreation

Impacts concerning Primitive TMA would be similar to Alternative B, although covering a slightly smaller area. Impacts concerning SRMAs and ERMAs would be similar to those described under Alternative C.

Impacts from Lands and Realty

Impacts would be similar to those described under Alternative A

Cumulative Impacts

The area of analysis for cumulative impacts is defined as the Planning Area and the surrounding communities in southern Utah and southeastern Nevada, within approximately 50 miles.

Recent changes to livestock management due to additional protective measures for threatened and endangered species resulted in major changes to livestock grazing operations. These protective measures were a result of making the entire Tassi Allotment and portions of the Mosby-Nay, Pakoon Springs, and Pakoon allotments unavailable to grazing due to the 1998 Plan amendment. All grazing preferences associated with these allotments, or portions thereof, were canceled, which resulted in the removal of 2,006 AUMS and some 127,500 acres for livestock grazing. In addition, all ephemeral extensions on the Beaver Dam Slope, Highway, and Mormon Well allotments and on the tortoise portion of the Mesquite and Littlefield allotments were canceled, which involved an additional 144,027 acres and a reduction in 2,575 AUMs.

If Alternative B were implemented, several additional livestock grazing allotments in critical desert tortoise habitat would be unavailable for livestock grazing. These allotments include most of Mosby-Nay, Pakoon, and Pakoon Springs, most of Mesquite (Littlefield Slope Pasture only), and Littlefield Community (Littlefield Slope Pasture only), and all of the Beaver Dam Slope, Highway, and Mormon Well. A total of 201,917 acres would be unavailable for livestock grazing, resulting in the removal of an additional 7,489 AUMs beyond the 4,581 AUM reductions due to the 1998 Plan amendment.

Under Alternative B, the Tuweep Allotment (Parashant and Arizona Strip FO) and the River Pasture of the Lees Ferry Grazing Allotment (Vermilion) would not be available for livestock grazing, which would result in an additional loss of 1,730 AUMs. Thus, cumulative impacts with respect to the 1998 Plan amendment and implementation of the most restrictive alternative in this FEIS (Alternative B) could result in livestock grazing operators losing 13,800 AUMs within the Planning Area. A reduction in 13,800 AUMs is equivalent to over 1,150 head of cattle yearlong that would no longer be allowed to graze on public lands in the Arizona Strip District. Using $89.70 per AUM (Fletcher et. al. 2006), the total economic value of these AUMs lost would be $1,237,860.

Closing these allotments and portions of other allotments would have a major affect on the economic viability of cattle operations within the Desert Tortoise DWMAs and ACECs. These grazing operations depend on the use of public rangelands to sustain their base herds. Similarly, in the long term due to lands and realty actions or heavy recreational use activities, there may be

additional loss of public lands available for grazing as population in and adjacent to the planning area increases.

In addition, other resource protection designations, while varying by alternative, result in major impacts to livestock grazing in the Planning Area. Similar protective designations are in place and being developed in adjacent surrounding areas and throughout the west. These impacts stem from program activities that are restrictive and/or protective by nature, such as those relating to VRM classes (I and II), ACECs, areas identified with Wilderness Characteristics, Primitive TMAs, sensitive species habitats, wilderness, and National Monuments.

In the long term, as this Plan is implemented and the surrounding area population increases, which would increase the use of public lands, additional conflicts between livestock grazing and other uses could arise. Resolving conflicts may require more adjustments and/or restrictions placed on livestock grazing management. These new adjustments and/or restrictions may result in changes to the normal, day-to-day livestock management activities. Eventually, permitted use may need to be modified throughout the Arizona Strip District.

Other factors influence livestock grazing operations, such as climatic and market fluctuations. A six-year drought in the Planning Area occurred between 1998 and 2004 and dramatically affected livestock grazing operations on the Arizona Strip, resulting in virtually all cattle being pulled from the public lands in 2004. Similar fluctuations in livestock numbers would likely occur in the future.

MINERALS

Mineral resources include fluid and solid minerals leased for development under the Mineral Leasing Act of 1920 and amendments, locatable minerals that may be claimed and patented under the 1872 Mining Law, and common variety materials that may be purchased under the Mineral Materials Sales Act of 1947. The public lands within the National Monuments and designated wilderness are closed to mineral exploration and development subject to valid, existing rights. Non-federal mineral estate exists within the Monuments, much of which is under Federal surface in Parashant (split-estate).

Leasable Minerals: Fluid minerals (oil and gas) are the only leasable commodities analyzed (See Appendix 4.B). No reasonable foreseeable development of geothermal resources, coal, sodium, potassium, or other leasable mineral resource is anticipated. If other leasable minerals were found in commercially exploitable deposits, the Arizona Strip FO would provide a program for development of such commodities.

The impact issues for fluid minerals result from management decisions for the protection of other resources. Constraints related to the fluid mineral leasing categories are presented in the form of stipulations as described in Appendix 2.I. The requirements of the stipulations can include, but

are not limited to, restrictions on seasonal access, designation of buffers around sensitive areas, or other activities that would be critical to protecting a particular resource.

Resources potentially impacted by fluid mineral development are often protected by attaching a lease notice to lease contracts. A lease notice indicates what potential resources may be affected in a given lease and notifies the lessee that they must contact the BLM Authorized Officer before ground disturbing activities occur to find out what actions or mitigation may be needed to protect those resources. Noncompliance with the lease notice may result in revocation of the lease.

In general, the alternatives would affect fluid mineral development by varying the amounts of land available for leasing and the lease terms and conditions. Impacts can range from major (loss of minerals and revenues as a result of closure of lands to development) to negligible (activities conducted under standard lease terms and conditions).

Locatable Minerals: Management decisions and actions aimed at protecting other resources could result in the closure of lands available for locatable mineral exploration and development. Other issues include restrictions governing locatable mineral exploration and development.

In general, the alternatives would affect locatable mineral development by varying the amounts of land open to the operation of the mining laws and the areas open with restrictions or open with a plan of operation for each alternative. Impacts can range from major (loss of minerals and revenues as a result of closure of lands to development) to negligible (activities conducted under standard reclamation terms and conditions).

Mineral Materials: Management decisions and actions aimed at protecting other resources could also result in the closure of lands available for the extraction and disposal of mineral materials. Other impacts may result from restrictions governing the extraction and disposal of mineral materials.

In general, the alternatives would affect mineral material disposals by limiting the amount of land available for disposal sites and the areas open with restrictions. Impacts can range from major (loss of minerals and revenues as a result of closure of lands for mineral material disposal) to negligible (activities conducted under standard reclamation terms and conditions).

Methods and Assumptions

The analysis of potential impacts is based on review of existing literature, geologic maps, field trips, site visits, and information provided by non-planning team experts in the BLM, NPS, USGS, and other agencies. Analyses on mineral resources are also based on the expertise of BLM resource specialists at the Arizona Strip FO and the NPS staff at Parashant and Lake Mead NRA.

Effects are quantified where possible. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: The impact would be inconsequential. There would be no perceptible change in the availability of land for mineral development or to the economics of exploration and extraction.

Minor: The impact would be detectable. The beneficial or adverse impact would be measurable or perceptible, but it would only slightly affect the availability of land for mineral development or the economics of exploration and extraction.

Moderate: The impact would be readily apparent, either beneficial or adverse. There would be a significant, measurable, or perceptible change in the availability of land for mineral development or the economics of exploration and extraction.

Major: The impact would be severe. The adverse impact on mineral resources would be substantial. Actions would result in a dramatic change to the availability of land for mineral development or the economics of exploration and extraction.

The following assumptions have also been made:

Leasable Minerals: A reasonably foreseeable development scenario for oil and gas was developed in conformance with BLM Instruction Memorandum No. 2004-089 (see Appendix 4.B). The reasonable foreseeable development scenarios were developed based on past exploration activities and reasonable estimates for future exploration and development given the following assumptions:

- On average, one Application for Permit to Drill (APD) has been received per year for the Planning Area. It is predicted this level of activity will continue over the next 20 years. No economic development or production of fluid minerals has occurred in the Planning Area.
- Approximately 7 acres would be disturbed per well by oil and gas drilling operations, making the total area of related disturbance during this time period 140 acres. If reclamation were completed immediately following drilling and full re-vegetation takes 10 years, the maximum area disturbed at any one time would be 70 acres.
- Geophysical exploration operations would comply with the terms and conditions for notice of intent to conduct geophysical exploration provided on BLM Form 3150-4a. Notices of intent submitted for the conduct of geophysical surveys would be evaluated on a case-by-case basis.
- Lands in the Planning Area designated closed to fluid mineral leasing (Category 4) are National Monuments and designated wilderness. Split estate lands with federal subsurface mineral estate would be designated in the same oil and gas leasing category as adjacent lands.

Split estate lands with federal subsurface mineral estate in the Community Management Unit would be designated as no surface occupancy (Category 3).

Locatable Minerals:

- There would be no major regulatory changes in federal or state statutes, regulations, policy, or guidance that govern the exploration and development of locatable minerals.
- Commodity prices in the future would provide sufficient economic incentive to support the production of locatable mineral commodities.
- The level of activity during the previous 20 years is anticipated to continue over the life of this Plan. Over the past 20 years, six underground uranium mines and one surface gypsum mine were developed in the Planning Area.
- Typically, uranium mines, from initial development to reclamation, last approximately 10 years. Disturbances at each mine site generally result in approximately 20 acres of surface area impacted. Given the assumption that this level of activity will continue over the next 20 years, the maximum area disturbed at any one time by uranium mining is expected to be approximately 120 acres.
- Economically viable gypsum mining within the Planning Area began in 1990. Over the past 10 years, the area disturbed by gypsum mining has roughly doubled from about 100 acres to 200 acres. Reclamation of the disturbances created by gypsum mines are concurrent with mining, however, the soil type has a low productive potential and may take more than 20 years for the native vegetation to re-establish. It is projected that at any one time, over the next 20 years, gypsum mines would impact about 300 acres including pits, waste rock piles, processing facilities, roads, exploration drill pads and roads, and office facilities along with vehicle repair shops. Given the assumption that this level of activity will continue for the next 20 years, the maximum area disturbed at any one time by gypsum mining is expected to be approximately 600 acres.
- Total surface disturbance from locatable mining development during the planning period is anticipated to be 720 acres.

Mineral Materials:

- There would be no major regulatory changes in federal or state statutes, regulations, policy, or guidance that govern the exploration and development of mineral materials.
- Population growth would continue to increase in the communities within the Planning Area and in southern Utah, northern Arizona, and southeastern Nevada.
- The demand for mineral materials would depend on market conditions and be expected to double during the planning period.
- Most of the mineral material sites in the Planning Area disturb less than 5 acres and would be reclaimed immediately after closing. Complete reclamation, including re-vegetation, may take up to 10 years. Currently, the total area impacted by the disposal of mineral materials is approximately 200 acres. It is anticipated this figure could double over the next 20 years and the total disturbance from mineral material disposal would reach approximately 400 acres.

Impacts to Mineral Resources

There would be no impacts to Monument mineral resources under any of the alternatives because BLM and NPS lands within the Monuments are withdrawn by their proclamations "from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws, including but not limited to withdrawal from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the Monument."

The establishment of the Monuments was subject to valid existing rights. Within the Monuments, there are currently no federal mineral leases, mining claims, or mineral interests that would constitute valid existing rights. Since no new federal mineral leases or prospecting permits may be issued, nor may new mining claims be located within the Monuments, mineral exploration and development would be excluded from federal land within either Monument. However, non-federal mineral estate exists within both Monuments, most of which is under federal surface in Parashant (split-estate).

Existing material sites on BLM lands in the Monuments and the Arizona Strip FO would continue to be used for BLM, NPS, and county road maintenance. In Vermilion, existing mineral material sites along House Rock Valley/Two Mile Road (1065) would be retained for administrative use for road maintenance.

Impacts to mineral resources in the Arizona Strip FO would result from actions proposed under the following resource management programs:

- Special Status Species
- Soil, Air, and Water
- Visual Resources
- Special Designation
- Wilderness Characteristics
- Lands and Realty

Alternative A: No Action

<u>Impacts from Special Status Species (Arizona Strip FO only)</u>

Fluid Leasable Minerals: Seasonal restrictions placed to protect Peregrine Falcon, bighorn sheep and desert tortoise under Alternative A could have minor to moderate impacts on oil and gas exploration and development. Such restrictions could limit exploration, drilling, and other surface-disturbing activities, which could affect the timing and costs of such activities. Exceptions to this limitation in any year may be specifically authorized in writing by the authorized officer of the federal surface management agency if it is shown to the satisfaction of

the authorized officer that adverse impacts to the species would not occur. Any predictable adverse impacts to special status species from leasable mineral requests could lead to modification of the proposal or denial of a lease. Proposal modifications could affect mineral operations by increasing associated costs and increasing the time needed to permit and conduct operations.

Locatable Minerals: Requiring a plan of operation for mineral development in any lands or waters known to contain federally proposed or listed threatened or endangered species or their proposed or designated critical habitat could increase the cost and time needed to complete some exploration activities. Impacts would range from negligible to minor.

Mineral Materials: Closing areas containing special status species or their habitats to mineral material disposals could have moderate to major impacts to mineral material exploration and development. Under Alternative A, 210,748 acres would be closed to mineral material disposals.

Impacts from Soil, Air, and Water (Arizona Strip FO only)

Locatable Minerals: Under Alternative A, dust control would be required for compliance with the Arizona Department of Environmental Quality (ADEQ) laws, rules, and policies for the surface mining of gypsum. Such dust control would place a significant expense on the mining and processing of gypsum. The impacts to locatable minerals would be moderate.

Impacts from Visual Resources (Arizona Strip FO only)

Fluid Leasable Minerals: Under Alternative A, visual resources are classified as fluid mineral leasing Category 3 (no surface occupancy) in the vicinity of Kanab Creek, Hurricane Cliffs, Diamond Butte, Moccasin Mountains, and the north slopes of Mokiac and Seegmiller mountains. Overall, these visual resources are correlative with VRM Class II. Exceptions to this limitation may be specifically authorized in writing by the authorized officer of the federal surface management agency if it is shown to the satisfaction of the authorized officer that the proposed disturbance or occupancy will not impair the visual resources of the area. No surface occupancy restrictions significantly increase the cost and time needed to complete exploration and development activities and may cause the costs of exploration and extraction to escalate to the point where the economics of oil and gas development would be marginal. Impacts would range from moderate to major in those areas where no surface occupancy applies. Under Alternative A, 98,375 acres would be designated as fluid mineral leasing Category 3.

Locatable Minerals: Areas designated as having specific visual contract ratings have no affect on the ability to explore and develop lands under the operation of the mining laws. However, mitigations that are more extensive could be developed to protect high resource values in some areas. Therefore, visual resources would have negligible to minor impacts on locatable minerals.

Mineral Materials: The disposal of mineral materials in VRM Class II areas would not be allowed if reasonable alternative sources were available. Impacts on exploration and development of mineral materials would range from negligible to minor. Under Alternative A, 573,243 acres would be designated as VRM Class II.

Impacts from Special Designation (Arizona Strip FO only)

Fluid Leasable Minerals: Under Alternative A, various levels of impacts would occur from Special Designations. Designating ACECs, which are classified as Category 1, or Category 2 for fluid mineral leasing, would result in negligible to moderate impacts, depending on the resources being protected. Category 1 designations would result in negligible to minor impacts as restrictions would be minimal. Category 2 designations would cause minor to moderate impacts as special terms or seasonal restrictions tend to increase the cost and time needed to complete exploration and development activities. The Virgin River Gorge scenic withdrawal would retain its Category 3 classification, which would result in moderate to major impacts due to the no surface occupancy restrictions. Category 4 is closed to fluid mineral leasing and corresponds to designated wilderness, which results in major impacts since no exploration or development could occur. Under Alternative A, ACECs encompass 13,337 acres of lands designated as Category 1 and 141,207 acres of lands designated as Category 2, the Virgin River Gorge scenic withdrawal contains 23,187 of lands designated as Category 3, and designated wilderness encompasses 80,672 acres.

Locatable Minerals: Under Alternative A, 100,896 acres would be withdrawn from the operation of the mining laws, subject to valid existing rights. This would apply to the Grand Canyon Game Preserve, Virgin River Gorge scenic withdrawal, and designated wilderness, which would result in major impacts to locatable minerals since no mineral exploration and development could occur within these areas.

Mineral Materials: Under Alternative A, designated wilderness and all ACECs would be closed to mineral material disposal, with the exception that existing material sites would be evaluated for retention in Johnson Spring, Lost Spring Mountain, and Moonshine Ridge ACECs. Impacts would be moderate to major since these resources in lands designated closed to mineral material disposal would not be available. Under Alternative A, 210,748 acres would be closed to mineral material disposals.

Impacts from Wilderness Characteristics (Arizona Strip FO only)

No acres would be identified for the maintenance of wilderness characteristics under Alternative A.

Impacts from Lands and Realty (Arizona Strip FO only)

The acquisition of state and private lands could have a positive impact on the development of mineral resources that may underlie these lands. Impacts would be moderate to major. However, the lands identified for acquisition are primarily in the Monuments, designated wilderness, or areas with high resource values for threatened and endangered species, which would be closed or severely restrictive to mineral exploration and development.

Conversely, the disposal of public lands could adversely affect prospective mineral development. The majority of the lands that would be disposed of are located in areas identified as having high potential for locatable minerals and moderate potential for oil and gas. Once these lands leave public ownership and become developed, the likelihood of mineral exploration on the tracts would be minimal. Without exploration, any mineral resources that may underlie the tract would probably not be developed throughout the life of this Plan. Under Alternative A, 24,081 acres are identified for disposal.

Alternative B

Impacts from Special Status Species (Arizona Strip FO only)

Impacts would be the similar to those described under Alternative A, except that the impacts to fluid leasable minerals would not be as widespread as there would be no seasonal restrictions on exploration, drilling, and other surface-disturbing activities to protect Peregrine Falcons and bighorn sheep.

Impacts from Soil, Air, and Water (Arizona Strip FO only)

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

Impacts from Visual Resources (Arizona Strip FO only)

Fluid Leasable Minerals: Fluid Leasable Minerals: Under Alternative B, no surface occupancy restrictions (fluid mineral leasing Category 3) would be designated to protect specific visual resources, as under Alternatives A and E. The no surface occupancy restrictions (fluid mineral leasing Category 3) would coincide with areas identified as having wilderness characteristics; however, mitigations could be developed to protect visual resources, which would likely increase exploration and development costs. Therefore, impacts on fluid leasable minerals would be minor to moderate.

Locatable Minerals: Impacts would be the same as those described under Alternative A.

Mineral Materials: The types of impacts would be the same as described under Alternative A, although not as widespread as However, impacts would not be as widespread under Alternative B as slightly more acres would be designated VRM Class II.

Impacts from Special Designation (Arizona Strip FO only)

Fluid Leasable Minerals: Under Alternative B, all ACECs would be designated fluid mineral leasing Category 2, which would result in minor to moderate impacts since additional special terms or seasonal restrictions tends to increase the cost and time needed to complete exploration and development activities. Since substantially more acres would be under ACEC designation under Alternative B, which would result in 377,275 acres in fluid mineral leasing Category 2, impacts would be more widespread than under Alternative A.

Locatable Minerals: Impacts and acres withdrawn from the operation of the mining laws, subject to valid existing rights, would be the same as those described under Alternative A.

Mineral Materials: Under Alternative B, all ACECs would be closed to mineral material disposal, which would result in moderate to major impacts since these resources would not be available. A total of 405,353 acres would be closed to mineral material disposals under Alternative B, which is substantially more acres compared to Alternative A. The impacts would thus be more widespread under Alternative B.

Impacts from Wilderness Characteristics (Arizona Strip FO only)

Fluid Leasable Minerals: Under Alternative B, 46,135 acres in the Arizona Strip FO would be identified to maintain wilderness characteristics. These lands would be open to oil and gas leasing subject to no surface occupancy (Category 3), which would result in moderate to major impacts. Exceptions to this limitation may be specifically authorized in writing by the authorized officer of the federal surface management agency if it is shown to the satisfaction of the authorized officer that the proposed disturbance or occupancy would not substantially impair the wilderness characteristics of the area. Under this alternative, no surface occupancy restrictions would apply to approximately 21,565 acres of land with a moderate potential for oil and gas.

Locatable Minerals: Areas with wilderness characteristics have no affect on the ability to explore and develop lands under the operation of the mining laws. However, mitigations that are more extensive would be required to protect resource values in these areas. Therefore, areas with wilderness characteristics would have minor to moderate impacts on locatable minerals.

Mineral Materials: While lands that would be managed for wilderness characteristics would be closed to mineral material disposals under Alternative B, such areas are remote, without roads, and without demand for mineral material. Impacts would thus be negligible.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as those described for Alternative A, with the exception that more acres of state and private lands are proposed for acquisition, and fewer acres of public lands are proposed for disposal, which could benefit the minerals program.

Alternative C

Impacts from Special Status Species (Arizona Strip FO only)

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

Impacts from Soil, Air, and Water (Arizona Strip FO only)

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

Impacts from Visual Resources (Arizona Strip FO only)

Fluid Leasable Minerals: Impacts would be the same as described under Alternative B

Locatable Minerals: Impacts would be the same as those described under Alternative A.

Mineral Materials: The types of impacts would be the same as described under Alternative A; however, impacts would be less widespread than under Alternative C as 202,091 acres would be designated VRM Class II, which is fewer than under Alternatives A or B.

Impacts from Special Designation (Arizona Strip FO only)

Fluid Leasable Minerals: Impacts would be similar as described under Alternative B: however, impacts would be less widespread under Alternative C as there would be fewer (132,101) acres under ACEC designation.

Locatable Minerals: Impacts and acres withdrawn from the operation of the mining laws, subject to valid existing rights, would be the same as those described under Alternative A.

Mineral Materials: Impacts would be similar as described under Alternative B: however, impacts would be less widespread under Alternative C as there would be fewer (132,101) acres under ACEC designation.

Impacts from Wilderness Characteristics (Arizona Strip FO only)

Fluid Leasable Minerals: The types of impacts would be similar to those described under Alternative B; however, since more (77,575) acres would be allocated to maintain wilderness

characteristics, impacts would be more widespread. Under Alternative C, no surface occupancy restrictions would apply to approximately 51,665 acres of land with a moderate potential for oil and gas, which is nearly twice as many acres compared to Alternative B, making impacts more widespread.

Locatable Minerals: Impacts would be the same as those described under Alternative B.

Mineral Materials: Impacts would be the same as those described under Alternative B.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as those described under Alternative A, except less widespread as fewer (9,743) acres are identified for disposal. Impacts would be more widespread than under Alternative B.

Alternative D

Impacts from Special Status Species (Arizona Strip FO only)

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

Impacts from Soil, Air, and Water (Arizona Strip FO only)

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

Impacts from Visual Resources (Arizona Strip FO only)

Fluid Leasable Minerals: Impacts would be the same as described under Alternative B.

Locatable Minerals: Impacts would be the same as those described under Alternative A.

Mineral Materials: The types of impacts would be the same as described under Alternative A; however, impacts would be less widespread than under all alternatives, including Alternatives A, as 164,932 acres would be designated VRM Class II under Alternative D.

Impacts from Special Designation (Arizona Strip FO only)

Fluid Leasable Minerals: Impacts would be similar as described under Alternative B: however, impacts would be less widespread than under all other alternatives as the fewest acres (106,420 acres) would be under ACEC designation.

Locatable Minerals: Impacts and acres withdrawn from the operation of the mining laws, subject to valid existing rights, would be the same as those described under Alternative A.

Mineral Materials: Impacts would be similar as described under Alternative B: however, impacts would be less widespread than under all other alternatives as the fewest acres (106,420 acres) would be under ACEC designation.

Impacts from Wilderness Characteristics (Arizona Strip FO only)

Fluid Leasable Minerals: The types of impacts would be similar to those described under Alternative B; however, impacts would be less widespread than both Alternatives B and C since less (34,628) acres would be allotted to maintain wilderness characteristics. Under Alternative D, no surface occupancy restrictions would apply to approximately 21,729 acres of land with a moderate potential for oil and gas, which is roughly half as many acres compared to Alternative B, and a quarter as many acres compared to Alternative C. Impacts would thus be less widespread.

Locatable Minerals: Impacts would be similar to those described under Alternative B.

Mineral Materials: Impacts would be the same as those described under Alternative B.

Impacts from Lands and Realty (Arizona Strip FO only)

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

Alternative E: Proposed Plan

Impacts from Special Status Species (Arizona Strip FO only)

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

Impacts from Soil, Air, and Water (Arizona Strip FO only)

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

Impacts from Visual Resources (Arizona Strip FO only)

Fluid Leasable Minerals: Impacts would be similar to those described under Alternative A, except that under Alternative E, 64,325 acres would be designated as fluid mineral leasing Category 3 (no surface occupancy), which is approximately a third less acres than under Alternative A. Impacts would thus be less widespread.

Locatable Minerals: Impacts would be the same as those described under Alternative A.

Mineral Materials: The types of impacts would be the similar to those described under Alternative A; however, impacts would be less widespread than under Alternatives A and B but more widespread than Alternatives C and D due to 368,032 acres that would be designated VRM Class II under Alternative E.

Impacts from Special Designation (Arizona Strip FO only)

Fluid Leasable Minerals: The types of impacts would be similar to those described under Alternative A; however, under Alternative E, ACECs would encompass 150,105 acres of lands designated as Category 1 and 145,566 acres of lands designated as Category 2, the Virgin River Gorge scenic withdrawal would contain 23,187 of lands designated as Category 3, and designated wilderness would encompasses 80,765 acres.

Locatable Minerals: Impacts would be the same as those described under Alternative A.

Mineral Materials: Impacts would be similar to those described under Alternative B; however the impacts would be less widespread than under Alternative B and more widespread than under Alternatives A, C and D due to 150,105 acres be proposed for ACEC designation under Alternative E.

Impacts from Wilderness Characteristics (Arizona Strip FO only)

Fluid Leasable Minerals: Under Alternative E, 34,942 acres would be allotted to maintain wilderness characteristics. These lands would be designated Category 1 (open to lease subject to standard lease terms and conditions and appropriate special stipulations). However, the special stipulations to maintain and protect wilderness characteristics would likely increase exploration and development costs. Therefore, wilderness characteristics would have minor to moderate impacts on fluid leasable minerals.

Locatable Minerals: Impacts would be similar to those described under Alternative B.

Mineral Materials: Impacts would be similar to those described under Alternative B.

Impacts from Lands and Realty (Arizona Strip FO only)

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

Cumulative Impacts

The geographic area of analysis for cumulative impacts to minerals is the Planning Area. Population growth and development would continue to increase the demand for land and for minerals. Mineral materials to be used in urban areas, such as St. George, for construction and decoration, are in high demand and are expected to increase pressure to develop these resources

As the communities in Clark and Lincoln counties, Nevada, and in Washington and Kane counties, Utah continue to expand, more emphasis would be on clean air and water, which would increase the pressure on mining industries to use more methods to produce minerals while leaving the surrounding environment cleaner. This could impact gypsum mining south of St. George, Utah. As the price of uranium continues to climb, it could be expected that the uranium mines on the Arizona Strip would be reopened and operated and new ones would be opened. Because they are located primarily in remote locations on the Arizona Strip, they would not be as affected by the growing communities as the gypsum industry.

RECREATION AND VISITOR SERVICES/INTERPRETATION AND ENVIRONMENTAL EDUCATION

This section presents potential impacts of the alternatives on outdoor recreation and visitor services as determined through potential changes to visitor and community resident preferences (activities, experiences, benefits), recreation setting conditions (physical, social, administrative), recreation management (resources, signing, facilities), recreation marketing (visitor services, information, interpretation and environmental education), recreation monitoring (inventory, monitoring), and recreation administration (permits and fees and visitor limits and regulations) as they are described in Chapter 3. These recreation features are interrelated and connected to access. For example, changes in recreation settings would result in corresponding changes in opportunities to achieve desired recreation experiences and associated benefits, influenced by access.

Recreational experiences and the potential attainment of a variety of beneficial outcomes are vulnerable to any management action that would alter the settings and opportunities in a particular area. Recreation settings are based upon a variety of attributes, such as remoteness, the amount of human modification in the natural environment, evidence of other users, restrictions and controls, and the level of motorized vehicle use. Management actions that greatly alter such features within a particular portion of the Planning Area could affect the capacity of that landscape to produce appropriate recreation opportunities and beneficial outcomes.

Methods and Assumptions

The analysis of potential impacts to recreation is based, in part, on visitor use reporting statistics from the Arizona Strip FO and the Recreation Management Information System (RMIS), which provide information on the number and types of recreational use. Spatial/GIS information was also used in this analysis and includes wildlife habitat boundaries, wilderness characteristic boundaries, transportation inventory, transportation designations, ecological zones, vegetation types, recreation sites, historic and recreational trails, and known historical/cultural sites. In the absence of data, analyses were based on the expertise of recreation planners at the Arizona Strip District Office. Combined, these experts possess an extensive knowledge of recreation resources

within the Planning Area. The impact analysis is also based on review of existing literature and information provided by non-planning team experts in the BLM, NPS, and other agencies.

Effects are quantified where possible. In absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: The impact would not be detectable. Changes to recreation settings and opportunities would only affect the experiences of a small number of recreational users.

Minor: The impact would be detectable. Changes to recreation settings and opportunities would affect the experiences of a larger, but not significant number of recreational users

Moderate: The impact would be readily apparent. Changes to recreation settings and opportunities would affect the experiences of a large number of recreational users.

Major: The impact would be severe. Changes to recreation settings and opportunities would affect the experiences of a majority of recreational users.

Impacts to recreation settings and opportunities would result from actions proposed under the following resource management programs:

- Travel Management
- Wilderness Characteristics
- Vegetation and Fire and Fuels Management
- Fish and Wildlife
- Special Status Species
- Visual Resources
- Cultural Resources
- Livestock Grazing
- Recreation and Visitor Services/Interpretation and Environmental Education

Alternative A: No Action

<u>Impacts from Travel Management</u>

TMA Delineation: No TMAs would be identified under Alternative A.

OHV Area Designations: Under Alternative A, the OHV area designations would close 498,196 acres; limit to existing roads and trails on 1,575,140 acres; limit to designated roads and

trails on 1,248,569 acres; and open 803 acres to motorized and mechanized vehicle use. Due to the nature of these OHV area designations in the Planning Area, motorized and mechanized cross-country vehicle travel would continue to be generally prohibited, with exceptions for certain agency and permitted uses. The exception to this is the 803-acre area near Fredonia which would be designated "open," where all types of vehicle use is permitted at all times, anywhere in the area subject to the operating regulations and vehicle standards set forth in various CFR sections. In the Monuments, all vehicles and bicycles would be restricted to designated roads, pending route designation. While this could eventually restrict OHV use to fewer, but specific roads and trails, OHV users would continue to have access to the existing road network until such designations were made. This would maintain the existing recreation opportunities in the Monuments for a significant period of time, which would benefit motorized users and those local businesses that rely on them. However, because of rapid growth in the St. George area, and the corresponding increase in OHV sales, maintaining existing recreation opportunities and social settings could also have minor to moderate impacts on non-motorized users due to potential increases in motorized use.

Similar impacts to both motorized and non-motorized users would occur on the Arizona Strip FO, but because vehicles would have access to all existing roads and trails for up to 5 years, pending long-term route designations, such impacts would last for that 5-year period.

Route Designations: Under Alternative A, 2,161 miles of roads would remain open to motorized travel in the Monuments and no roads would be closed. This would preserve existing available opportunities for motorized recreational use and current recreational settings would remain unchanged. This would result in moderately beneficial impacts on motorized recreational users and those businesses that support them. However, because of rapid growth in the St. George area and the corresponding increase in OHV sales, maintaining existing recreation opportunities and social settings in their current condition could also have minor to moderate impacts on non-motorized users due to potential increases in motorized use.

Similar impacts to both motorized and non-motorized users would occur on the Arizona Strip FO, but because vehicles would have access to all existing roads and trails for up to 5 years, pending long-term route designations, such impacts would last for a longer period.

Trail Construction: No decision would be made under this alternative.

Wheeled Game Carriers: Allowing non-motorized, wheeled game carriers to retrieve game kills in all areas of the Monuments and Arizona Strip FO lands, except in designated and NPS proposed wilderness, would continue to enhance hunting opportunities.

Impacts from Wilderness Characteristics

No areas would be managed for wilderness characteristics under Alternative A.

Impacts from Vegetation and Fire and Fuels Management

Depending on the type, scope, and intensity, vegetation treatments could directly impact recreation settings and associated visitor experiences in the Monuments and the Arizona Strip FO, as well as the possible realization of specific benefits. Impacts in treated areas could range from negligible to moderate. The duration of the impacts would be dependent on the type of treatment being applied. In the long term, having a full range of tools for restoring the landscape to its natural condition would enhance recreation experiences and settings.

Impacts from Fish and Wildlife

Improving wildlife habitat where needed would help maintain viable game populations. This could benefit hunters and those seeking wildlife watching opportunities. Depending on the scope and intensity of habitat improvement efforts, impacts to recreational opportunities could be mixed. Physical recreational settings could have impacts similar to those described in the Impacts to Vegetation section. Those impacts could range from negligible to moderate. Any increases in game populations and other wildlife populations could enhance hunting and wildlife watching opportunities. Those impacts could also range from negligible to moderate.

Impacts from Special Status Species

Under this alternative, existing road closures and camping restrictions related to desert tortoise could have a negligible to minor effect on recreational opportunities in Parashant and the Arizona Strip FO.

Impacts from Visual Resources

Under Alternative A, the VRM designations would involve 267,897 acres of Class I, 1,125,940 acres of Class II, 758,041 acres of Class III, and 1,307,047 acres of Class IV. The entire Vermilion would remain designated VRM Class I or II. Such designations involve stringent design parameters and/or project mitigation on most developments/disturbances that could affect solitude, naturalness, and primitive/unconfined recreation. Some projects could still be allowed that could result in localized impacts, which would range from negligible to minor, depending on the type of project. In contrast, Parashant and the Arizona Strip FO would have significant acreage designated as VRM Class III and IV, which would allow for more landscape modifications than VRM classes I or II. Projects that may be approved under VRM Class III or IV include vegetation treatments, communications towers, and range developments. Impacts would be long-term, and depending on what projects are proposed, could range from minor to major.

Impacts from Cultural Resources

Under Alternative A, current designations of public use sites in the Monuments and the Arizona Strip FO would maintain existing opportunities for visitors to enjoy historic or prehistoric cultural resources.

Impacts from Livestock Grazing

Livestock grazing can impact recreation settings and opportunities. The presence of livestock could cause recreational users to avoid those areas where cattle are present. In general, grazing impacts to recreational settings and opportunities would be localized, seasonal, and range from minor to moderate, depending on the number of livestock present. Under Alternative A, the majority of both Monument and the Arizona Strip FO would remain available to grazing with only 199,350 acres unavailable to grazing.

Impacts from Recreation and Visitor Services/Interpretation and Environmental Education

Special Recreation Management Areas and Extensive Recreation Management Areas: Under Alternative A, all existing SRMAs would retain their current status. Full implementation of existing SRMA objectives through the development of activity plans would provide visitors higher quality recreation opportunities through the more focused and effective management of the desired settings, activities, and experience opportunities appropriate for each SRMA. Impacts to recreation settings would range from minor to moderate.

Under this alternative, an emphasis would be placed on maintaining existing recreation settings and opportunities. In the long term, moderate impacts could result as visitation increases due to a rapidly expanding population in southern Utah. Potential user conflicts and degradation of the resource settings due to overuse are possible.

Signing and Facilities: Signing and other forms of visitor information could enhance public safety and improve recreational user experiences. Impacts from improvements would be positive and range from minor to moderate.

Recreation Marketing Actions: Under Alternative A, visitors would be provided accurate information regarding recreation opportunities, interpretation of natural and human history, and specific rules and regulations pertaining to their use of the Monuments and the Arizona Strip FO. Impacts from improvements would be positive and range from minor to moderate.

Interpretation and Environmental Education: No decisions would be made under this alternative.

Visitor Limits and Regulations*:* Under Alternative A, management responses to unacceptable resource and/or social condition would range from the least restrictive methods (e.g., information

and education) to most restrictive (e.g., visitor limits, supplemental rules, or restrictions), with emphasis given to using the least restrictive methods. Such responses would be instituted only when monitoring indicates a trend toward unacceptable change to desired recreation settings brought about by such use. By monitoring and addressing resource/social changes before they become unacceptable, taking preemptive action could result in long-term maintenance of recreational settings. Impacts would be positive and range from minor to moderate.

Camping*:* Non-motorized, dispersed camping would be allowed, although potential limits could be placed in listed species and other sensitive habitats. Visitors would be allowed to collect dead and down wood for campfires in areas where fires are allowed. Impacts to recreation settings and opportunities would be minor.

Geocaching: On-the-ground placement of geocaches would be prohibited in archeological sites, alcoves, rock shelters, threatened and endangered species habitat, raptor nesting sites, designated and NPS proposed wilderness areas, or where identified Monument objects would be at risk. This would place restrictions on where geocache enthusiasts could locate their caches. Impacts to recreational users would be minor.

Permits and Fees: Under Alternative A, by using monitoring data and involving the public in any decisions to establish new permits, fees, visitor limits, regulations, or other restrictions, management response to unacceptable resource/social condition changes would be measured and appropriate. Impacts to recreational settings and experiences would likely be enhanced and these impacts could range from minor to moderate**.**

SRP Administration: Given substantial increases in workload due to an expanding population and the increasing attraction of the Monuments, the current case-by-case authorization of commercial, competitive, and vending permits is inefficient. This process may eventually preclude many local and regional recreation providers from making available certain recreation opportunities to serve a growing demand. Impacts to recreational providers could be moderate.

Alternative B

Impacts from Travel Management

TMA Delineation: Under Alternative B, over 85 percent of the Monuments would be delineated as the Primitive TMA, which is the most restrictive of the alternatives. Under this alternative, opportunities for motorized recreation would decrease significantly in the Monuments, having major impacts on recreational OHV use and the businesses in nearby communities that cater to those users. This alternative would also concentrate steadily increasing motorized use into fewer access corridors, creating the potential for conflicts between users and a general degradation of the social aspects of backcountry motorized experiences. Conversely, opportunities for non-motorized recreational use would increase dramatically. These impacts

would be moderate to major for non-motorized users such as hikers, equestrians, and mountain bikers and the businesses that support them.

With a preliminary route network in place on the majority of the Arizona Strip FO lands for up to 5 years, existing conditions change very little by alternative; thus, any impacts to motorized or non-motorized recreation would be negligible.

OHV Area Designations: Under Alternative B, the OHV area designations would close 467,744 acres; limit to existing roads and trails on 0 acres; limit to designated roads and trails on 2,854,955 acres, and open 0 acres to motorized and mechanized vehicle use. Consequently, impacts would be the same as described under Alternative A.

Route Designations: Under Alternative B, 798 miles of roads would remain open to motorized travel in the Monuments, a 63 percent reduction in access compare to Alternative A. As a result, opportunities for motorized recreation would decrease greatly in the Monuments, generating moderate to major impacts on recreational OHV use and related businesses in nearby communities that cater to those users. This alternative would also concentrate steadily increasing motorized use to fewer roads, creating the potential for conflicts between users and a general degradation of the backcountry motorized experience. Conversely, opportunities for non-motorized recreational use would increase dramatically. These impacts would be major for non-motorized users like hikers, equestrians, and mountain bikers and the related businesses that support them.

The same impacts described under Alternative A would affect both motorized and non-motorized users on Arizona Strip FO lands in the short–term. In the long-term, impacts would be the result of future route designations, which are described above under OHV Area Designations.

Trail Construction: Under Alternative B, trail construction (non-motorized) in the Monuments would be considered only when needed to protect sensitive resources. This action would limit non-motorized opportunities. However, considering the number of roads proposed to be limited to administrative motorized uses only under this alternative, the number of potential routes for hiking, equestrian, and biking could increase dramatically, making the impacts from this decision negligible.

Wheeled Game Carriers: Impacts would be the same as described under Alternative A.

Impacts from Wilderness Characteristics

Under Alternative B, approximately 508,052 acres in the Monuments would be managed with the goal of maintaining existing wilderness characteristics. This is the most acreage among all the alternatives. Implementation of this alternative would result in major impacts to recreational settings and opportunities. Due in part to potential route designations, large areas that exist as semi-primitive motorized settings would, in effect, become semi-primitive non-motorized in

terms of remoteness, effectively reducing motorized recreational opportunities. Conversely, non-motorized settings would expand and opportunities for primitive, unconfined recreation would increase dramatically. It should be noted that, although the area available for non-motorized recreation would increase, because of the large number of closed roads, motorized access to many of these areas would become more difficult.

In the Arizona Strip FO, approximately 46,135 acres would be managed with the goal of maintaining wilderness characteristics. The types of impacts to settings and opportunities would be similar to those in the Monuments, but because of the relatively small acreage, impacts would be negligible to minor. This is true for both motorized and non-motorized recreation. It should be noted that many of the lands prescribed for management of wilderness characteristics in the Arizona Strip FO under this alternative are prescribed for management as components of proposed ACEC designations, not as stand-alone areas.

Impacts from Vegetation and Fire and Fuels Management:

Under Alternative B, vegetation treatments on up to 36,600 acres would be greatly restricted in their scope and intensity in both the Monuments and the Arizona Strip FO. Recreation settings and experiences could suffer negligible to minor short-term impacts during any application period.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative A.

Impacts from Special Status Species

Under Alternative B, further limits or restrictions could be applied on certain recreation activities or uses that degrade any special status species habitat or causes injury or mortality to such species. In special status plant habitats, recreational opportunities would be limited to smaller-capacity, designated areas and hiking and biking would be allowed only on designated routes. Such actions would cause a minor reduction in recreational opportunities in Parashant and the Arizona Strip FO.

Impacts from Visual Resources

Under Alternative B, the VRM designations would involve 650,071 acres of Class I, 1,220,704 acres of Class II, 1,379,468 acres of Class III, and 72,827 acres of Class IV. Impacts in the Monuments would be similar to Alternative A as all lands would be designated as VRM Class I or II. The majority of acreage for the Arizona Strip FO would be designated VRM Class III, which would result in impacts similar to those described under Alternative A.

Impacts from Cultural Resources

Impacts would be similar to those described under Alternative A, except more widespread as additional public use sites would be designated.

Impacts from Livestock Grazing:

The types of impacts would be similar to those described under Alternative A. In Vermilion, the Paria Canyon and Coyote Buttes permit areas would be unavailable for grazing, which could affect up 10,000 visitors annually. Removal of all livestock from these areas would be seen as a positive step by many recreational users of the area. Impacts from this action would be moderate to major. In Parashant and the Arizona Strip FO, several allotments would be unavailable to grazing or have seasonal restrictions, with the resulting improvement to recreational settings associated with reduced grazing. These impacts would be moderate. Overall, with 494,131 acres of allotments unavailable for grazing and restrictions, Alternative B could enhance recreation opportunities and setting to the greatest degree compared to all other alternatives.

Impacts from Recreation

Special Recreation Management Areas and Extensive Recreation Management Areas: Under Alternative B, the current land-use planning handbook (H-1601-1, Appendix C. II. C.) approach to managing SRMAs would be used. Rather than focus on more intensive management of certain activities in a specific area, SRMA management would involve other recreation providers in the area/region, and each SRMA would target a specific primary recreation-tourism market (Community, Destination, or Undeveloped) based on demonstrated market demand. The general focus would be to produce recreation opportunities, the fulfillment of which generates visitor experiences, which should allow visitors, communities, and the environment to realize beneficial outcomes. Such management would be accomplished by maintaining or enhancing the recreation setting conditions in which recreation activities take place, thereby producing the desired outcomes. The impacts to SRMAs proposed under this alternative could range from minor to major.

Signing and Facilities: Under Alternative B, impacts would be similar to Alternative A, except that major visitor facilities (visitor center or contact stations) would not be constructed within the Planning Area.

Recreation Marketing Actions: Impacts would be similar to Alternative A, although additional resource information (e.g., maps, brochures, safety information, driving tour guides, Internet sites, etc.) would be distributed under Alternative B. This information would further assist visitors in having safe and enjoyable experiences. It could also spark increased visitation by attracting people to the area who would otherwise be unlikely to visit. This is especially true of those individuals who learn of recreation opportunities in the Monument over the Internet.

Interpretation and Environmental Education: Under Alternative B, information, interpretation, and environmental education would be more readily available, enhancing benefits to recreation experiences and serving as a management tool that could be used to mitigate resource and social impacts, reducing the need to use tighter restrictions. These impacts would be positive and moderate.

Visitor Limits and Regulations*:* Impacts would be similar to those discussed under Alternative A, with the exception that management responses to unacceptable resource and/or social condition would be used only when carrying capacities are exceeded. Compared to Alternative A, this would restrict the use of preemptive management techniques to limit or prevent impacts before they become problems. Long-term impacts to recreation settings under this alternative could range from minor to major, with high-use areas at the upper end of the scale.

Camping: Under Alternative B, no off-road vehicle camping would be allowed, and vehicle camping along designated routes would be allowed in designated sites only. This action could reduce availability of some existing campsites. Collection of dead and down wood for campfires would not be allowed. Such actions could have moderate to major impacts on recreational users.

Geocaching: Under Alternative B, geocache sites would be removed if, through monitoring, it were determined that important resources would be at risk of unacceptable change due to use of the sites. The impact to affected users would be minor.

Permits and Fees: Impacts would be similar to those described under Alternative A.

SRP Administration: Under Alternative B, shifting the SRP administration to an annual schedule would enhance the efficiency of BLM planners and would allow local and regional recreation providers to make more effective long-range plans. Annual training of permitted outfitters would reduce the potential for resource and social impacts. Impacts to recreational settings, users, and outfitters would be positive and moderate.

Alternative C

Impacts from Travel Management

TMA Delineation: Under Alternative C, there would be 1,090,685 acres available for motorized recreation (Specialized TMA), which would be more acres available in the Monuments compared to Alternative B, and less acres compared to Alternative A. This reduction could have minor to moderate impacts on recreational OHV use and the businesses in nearby communities that cater to those users. Consequently, opportunities for non-motorized recreational use would increase slightly. These impacts would be minor for non-motorized users like hikers, equestrian, and mountain bikers and the businesses that support them.

Impacts in the Arizona Strip FO would be similar to those discussed under Alternative B.

OHV Area Designations: Under Alternative C, the OHV area designations would close 467,744 acres, limit to existing roads and trails on 1,204,782 acres, limit to designated roads and trails on 1,648,603 acres and open 1,481 acres to motorized and mechanized vehicle use. Impacts in the Monuments would be the same as described under Alternative A. For the Arizona Strip FO, impacts would fall somewhere between Alternative A and Alternative B. Under this alternative, 35 percent of the Arizona Strip FO would be subject to route designation, while 61 percent would remain limited to existing roads and trails. Approximately 5 percent would be closed and less than 1 percent would be open. In the areas where no route designation takes place, motorized use could be expected to increase, while access to designated areas may decrease due to potential route closures. This could have minor impacts on motorized recreation visitors as the overall availability of routes may decrease slightly over the life of the Plan. It could also have mixed impacts on non-motorized recreation visitors as areas that undergo route designation may offer more opportunities to pursue non-motorized activities, while areas that would be exempt from route designation may have decreased opportunities for quality non-motorized activities. Overall impacts to non-motorized recreation would be minor.

Route Designations: Under Alternative C, 1,694 miles of roads would remain open to motorized travel in the Monuments, a significant increase over Alternative B, but still 467 miles less than what is available under Alternative A. This reduction could have minor to moderate impacts on recreational OHV use and the businesses in nearby communities that cater to those users. Conversely, opportunities for non-motorized recreational use would increase slightly. These impacts would be minor for non-motorized users like hikers, equestrian, and mountain bikers and the businesses that support them.

The same impacts described under Alternative A would affect both motorized and non-motorized users on Arizona Strip FO lands in the short term. In the long term, impacts would be the result of future route designations, which are described under the section on OHV Area Designations.

Trail Construction: Under Alternative C, trail construction (non-motorized) would be the minimum necessary to achieve plan provisions. This allows trail construction to occur when and where it is needed, which could result in an appropriate increase in non-motorized trail use. The impacts from this decision would be minor.

Wheeled Game Carriers: Impacts would be the same as described under Alternative A.

Impacts from Wilderness Characteristics

Under Alternative C, approximately 266,739 acres in the Monuments would be managed with the goal of maintaining wilderness characteristics. This is slightly more than half of what is proposed in Alternative B and more than twice what is proposed in Alternative D. The impacts to settings and opportunities would be the same as those described under Alternative B, but the degree of impact to both motorized and non-motorized recreation would be significantly less. It

should be noted that although the area available for non-motorized recreation would be significantly less under this alternative, access routes to these areas have been preserved, effectively expanding opportunities.

In the Arizona Strip FO, approximately 77,575 acres would be managed with the goal of maintaining wilderness characteristics. The types of impacts to settings and opportunities would be similar to those described in Alternative B. In the long term, having a greater range of tools for restoring the landscape to its natural condition would enhance recreation experiences and settings.

Impacts from Vegetation and Fire and Fuels Management:

Under Alternative C, vegetation treatments would have more latitude and a greater array of tools when compared to Alternative B. Recreation settings and experiences could suffer minor to moderate short-term impacts during and after the application period.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative A, with the exception that additional watchable wildlife areas could boost wildlife viewing opportunities. Impacts would be minor.

Impacts from Special Status Species

Impacts would similar to those described under Alternative B, with the exception that hiking would be allowed in special status plant habitat. In addition, education programs and law enforcement contact would be used to minimize recreational activities that cause injury or mortality or degrade habitat of special status species. Impacts to recreational settings and opportunities would be negligible to minor.

Impacts from Visual Resources

Under Alternative C, the VRM designations would be 581,698 acres of Class I; 782,866 acres of Class II; 1,885,678 acres of Class III; and 72,827 acres of Class IV. Some sections of Parashant and the majority of the Arizona Strip FO would be designated as VRM Class III, and impacts would be similar to those described in Alternative A. Unlike Alternative A, there is significantly fewer Class IV lands in Parashant (only 12 acres) and only a small portion in the Arizona Strip FO (72,803 acres or 92 percent reduction), allowing less in the way of noticeable landscape change than Alternative A, but more noticeable landscape change than Alternative B. In Vermilion, impacts are similar to those described under Alternative A.

Impacts from Cultural Resources

Impacts would be similar to those described under Alternative B.

Impacts from Livestock Grazing

Impacts would be similar to those described under Alternative B for Parashant and the Arizona Strip FO, with the exception that making lands unavailable for grazing would not occur in Paria Canyon and Coyote Buttes. Instead, seasonal restrictions would be placed under Alternative C, which would allow for the conflict between large numbers of wilderness users and livestock grazing. Such conflicts would occur over a shorter period when compared to Alternative A and could have moderate impacts to recreation opportunities in Vermilion.

Impacts from Recreation

Special Recreation Management Areas: Impacts would be similar to those described under Alternative B.

Signing and Facilities: Impacts would be similar to those described under Alternative B, with the exception that major facilities (e.g., visitor center or contact stations) could be built, but would be located in adjacent communities.

Recreation Marketing Actions: Impacts would be similar to those described under Alternative B.

Interpretation and Environmental Education: Impacts would be similar to those described under Alternative B.

Visitor Use Limits and Regulations: Impacts would be similar to those discussed under Alternative A, with the exception that management responses to unacceptable resource and/or social condition would be based on the LAC. This would allow the use of preemptive management techniques to limit or prevent impacts. Overall impacts to recreation opportunities could range from minor to moderate.

Camping: Impacts would be the same as described under Alternative B, with the exception that camping off designated roads would be allowed in existing sites or disturbed areas, which would provide visitors more camping opportunities. Impacts to recreational users would be minor.

Geocaching: Impacts would be similar to those described under Alternative B.

Recreation Marketing Actions: Impacts would be the same as described under Alternative B.

Permits and Fees: Impacts would be similar to those described under Alternative A.

SRP Administration: Impacts would be similar to those described under Alternative B, although slightly less efficient.

Alternative D

Impacts from Travel Management

TMA Delineation: Under Alternative D, there would be 1,158,781 acres available for motorized recreation. The number of acres in the Monuments available for motorized use would be similar to Alternative C, which is significantly more compared to Alternatives B. This alternative would have negligible impacts on recreational OHV use and the businesses in nearby communities that cater to those users. Consequently, there would be fewer opportunities for non-motorized recreational use compared to all other alternatives. Impacts would range from minor to moderate for non-motorized users (e.g., hikers, equestrian, and mountain bikers) and the businesses that support them.

Impacts in the Arizona Strip FO would be similar to those described under Alternative B.

OHV Area Designations: Under Alternative D, the OHV area designations would close 467,744 acres, limit to existing roads and trails on 1,511,652 acres, limit to designated roads and trails on 1,336,132 acres and open 7,186 acres to motorized and mechanized vehicle use. Impacts in the Monuments would be the same as described under Alternative A. For the Arizona Strip FO, impacts would be the greatest of all the Alternatives. With only 19 percent of Arizona Strip FO lands targeted for route designation in OHV area designations of "limited to designated roads and trails," 76 percent would remain open to motorized use in areas "limited to existing roads and trails." Approximately 5 percent would be closed and less than 1 percent would be open. This could have moderate impacts on motorized recreation visitors as their availability of routes would be protected at a level similar to existing conditions. The opposite would be true for non-motorized recreation visitors, and moderate impacts could result from the loss of areas being subject to route designation.

Route Designations: Impacts in the Monuments would be almost identical to that described under Alternative C.

The same impacts described under Alternative A would affect both motorized and non-motorized users on Arizona Strip FO lands in the short term. In the long term, impacts would be the result of future route designations, which are described in the section on OHV Area Designations.

Trail Construction: Under Alternative D, trail construction (non-motorized) could occur to support enhanced public use. This would provide a tool to support the growing population in the region and would allow trail construction to occur when and where it is needed. This could also

result in a significant increase in non-motorized trail use. The impacts from this decision would be moderate.

Wheeled Game Carriers: Impacts would be the same as described under Alternative A

Impacts from Wilderness Characteristics

Under Alternative D, approximately 140,949 acres in the Monuments would be managed with the goal of maintaining wilderness characteristics. This is significantly less than what is proposed in Alternative B and roughly two-thirds what is proposed in Alternative C. The impacts to settings and opportunities would be similar to those described under Alternatives B and C, but the degree of impact would change. Motorized recreational opportunities would be preserved and overall impacts to motorized recreation visitors would be minor. Non-motorized settings and opportunities would also expand and access to all areas would be preserved, but the total area available for non-motorized pursuits would be similar to Alternative A, which is significantly less than under Alternatives B and C. These impacts would be moderate.

In the Arizona Strip FO, approximately 34,628 acres would be managed with the goal of maintaining wilderness characteristics. The types of impacts to settings and opportunities would be similar to those described in Alternative B, but not as widespread.

Impacts from Vegetation and Fire and Fuels Management

Under Alternative D, vegetation treatments throughout the Planning Area would have more latitude and a fuller array of tools when compared to Alternatives B and C. Recreation settings and experiences could suffer minor to moderate short-term impacts during and after the application period. In the long term, having a full range of tools for restoring the landscape to its natural condition would enhance recreation experiences and settings.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative C.

Impacts from Special Status Species

Impacts would be similar to those described under Alternative C.

Impacts from Visual Resources

Under Alternative D, the VRM designations would be 453,922 acres of Class I, 843,291 acres of Class II, 1,947,036 acres of Class III, and 78,821 acres of Class IV. Impacts would be similar to those described under Alternative C.

Impacts from Cultural Resources

Impacts would be similar to those described under Alternative B.

Impacts from Livestock Grazing

Impacts would be similar to those described under Alternative B for Parashant and the Arizona Strip FO. Impacts would be similar to those described under Alternative C for Vermilion, except that the seasonal restrictions in Coyote Buttes would be removed, which would allow for year-long conflict between large numbers of wilderness users and livestock grazing and exacerbate an already difficult problem. This specific conflict could have major impacts.

Impacts from Recreation

Special Recreation Management Areas: Impacts would be similar to those described under Alternative B.

Signing and Facilities: Impacts would be similar to those described under Alternative C.

Recreation Marketing Actions: Impacts would be similar to those described under Alternative B.

Interpretation and Environmental Education: Impacts would be similar to those described under Alternative B.

Visitor Limits and Regulations: Impacts would be similar to those described under Alternative C.

Camping: Impacts would be similar to those described under Alternative C.

Geocaching: Under Alternative D, geocache sites would be relocated with help from local geocachers if, through monitoring, it were determined that important resources would be at risk of unacceptable change. The impact to recreational users would be negligible.

Recreation Marketing Actions: Impacts would be the same as described under Alternative B.

Permits and Fees: Impacts would be similar to those described under Alternative A.

SRP Administration: Impacts would be similar to those described under Alternative A.

Alternative E: Proposed Plan

Impacts from Travel Management

TMA Delineation: Impacts would be similar to those described under Alternative D in the Monuments and similar to those described under Alternatives B in the Arizona Strip FO.

OHV Area Designations: Under Alternative E, the OHV area designations would close 455,925 acres, limit to existing roads and trails on 0 acres, limit to designated roads and trails on 2,865,809 acres, and open 976 acres to motorized and mechanized vehicle use. Impacts would be the same as described under Alternative A.

Route Designations: Under Alternative E, 1,781 miles of roads would remain open to motorized travel in the Monuments, a minor increase over Alternative C, but still 380 miles less than what would be available under Alternative A. This reduction would have negligible impacts on recreational OHV use and the businesses in nearby communities that cater to those users. Conversely, opportunities for non-motorized recreational use could decrease slightly. These impacts would likely be minor to moderate for non-motorized users (e.g., hikers, equestrian, and mountain bikers) and the businesses that support them.

The same impacts described under Alternative A would affect both motorized and non-motorized users on Arizona Strip FO lands in the short–term. In the long-term, impacts would be the result of future route designations, which are described in the section on OHV Area Designations.

Trail Construction: Impacts would be the same as described under Alternative D.

Wheeled Game Carriers: Impacts would be the same as described under Alternative A

Impacts from Wilderness Characteristics

Impacts would be similar to those described under Alternative C.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be similar to those described under Alternative D.

Impacts from Fish and Wildlife

Impacts would be similar to those described under Alternative C.

Impacts from Special Status Species

Impacts would be similar to those described under Alternative C.

Impacts from Visual Resources

Under Alternative E, the VRM designations would be 461,804 acres of Class I, 1,164,582 acres of Class II, 1,623,763 acres of Class III, and 72,920 acres of Class IV. In Parashant, impacts would be similar to those described under Alternative C. In Vermilion, impacts would be similar to those described under Alternative B. Impacts in the Arizona Strip FO would also be similar to those described under Alternative B, albeit slightly more noticeable landscape change would be allowed due to 29 percent more of Class I lands and 5 percent more of Class II lands being designated as Class III under Alternative E.

Impacts from Cultural Resources

Impacts would be similar to those described under Alternative B.

Impacts from Livestock Grazing

Impacts would be similar to those described under Alternative B for Parashant and the Arizona Strip FO. Impacts would be similar to those described under Alternative B for the Paria Canyon portion of Vermilion, and similar to Alternative D for Coyote Buttes.

Impacts from Recreation

Special Recreation Management Areas: Impacts would be similar to those described under Alternative B.

Signing and Facilities: Impacts would be similar to those described under Alternative C.

Recreation Marketing Actions: Impacts would be similar to those described under Alternative B.

Interpretation and Environmental Education: Impacts would be similar to those described under Alternative B.

Visitor Limits and Regulations: In general, impacts would be the same as described under Alternative C, including use of LAC. The only difference is that carrying capacities may be established as wilderness management plans and activity plans are completed. Impacts from using carrying capacities in wilderness areas would be the same as described for the entire Monument under Alternative B.

Camping: Impacts would be similar to those described under Alternative C.

Geocaching: Impacts would be similar to those described under Alternative D.

Permits and Fees: Impacts would be similar to those described under Alternative A

SRP Administration: Impacts would be similar to those described under Alternative C.

Cumulative Impacts

The geographic area for analysis of cumulative impacts to recreation and visitor services/interpretation and environmental education is northern Arizona, southwestern Utah, and southeastern Nevada. Over time, continued population growth of the large and small communities in this area will contribute to greater visitation to the Planning Area. Additionally, the development of large blocks of Arizona State Trust lands for residential, commercial, urban, and other community expansion purposes will shift much of the recreation use that currently takes place on those lands to adjacent public lands. Such a shift will produce an increase in the creation of illegal routes and strong potential for shifting prescribed recreation settings toward more rural/urban character.

The growing need to decrease the potential for catastrophic fire in the region through mechanical treatments aimed at reducing fuel loads will gradually alter landscapes and recreation settings where treatments are conducted. Smoke from prescribed fires used for the same purpose will sporadically affect the quality of viewsheds and interfere with the public's viewing of scenery. The potential for noxious weed invasions in the region to change existing landscape form, texture, and color over large areas in a relatively short time will gradually affect the naturalness attribute of the physical setting component.

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

Continued application of visual resource design principles for permitted projects, activities, and uses on public lands will do much to maintain physical recreation settings within the Planning Area. A shift toward renewed uranium exploration and extraction will shift the remoteness attribute of physical recreation settings and the encounters with others attribute of the social recreation settings via the construction and regular use of new routes in non-Monument areas. As some shifting in the region occurs from agricultural-related businesses to recreation and tourism, some landscapes and recreation settings will be enhanced by the removal of unneeded structures. However, such a shift may create other impacts to recreation settings by providing

for more structured recreation, accompanied by increased visitation. Management of areas such as wilderness, proposed wilderness, areas having wilderness characteristics, and various ACECs will contribute to maintaining or enhancing landscapes and recreation setting conditions on scattered, large tracts of public land.

TRAVEL MANAGEMENT

The transportation network consists of several thousand miles of roads and trails, mostly unpaved, that provide access into and across the Planning Area. Various individuals rely on this network to access livestock operations, mining properties, utility and communication facilities, range and wildlife developments, wildfire prevention/management and suppression, special use areas, recreation sites, research areas, monitoring stations, and intermingled private- and state-owned lands. Management decisions that involve changes to miles of roads open for public or administrative use, different TMA objectives, number of acres open to off-road travel, road improvement or maintenance activities, or specific travel restrictions (e.g., speed limits, seasonal restrictions; etc.) would affect access into and across the Planning Area.

Methods and Assumptions

Baseline route inventories were completed for the two Monuments and several areas within the Arizona Strip FO. The Route Evaluation Tree© method (see Appendix 2.T) was then used to determine the status (e.g., open, limited in use, or completely closed) for existing routes under each of the alternatives except Alternative A. The potential impacts to access into and across the Planning Area as determined by the miles of routes open to public use is based on the results of the Route Evaluation Tree© process. BLM resource specialists at the Arizona Strip FO and NPS staff at Lake Mead NRA used their expertise in applying the Route Evaluation Tree© method and analyzing the impacts. Combined, these staff members possess an extensive knowledge of travel management and access issues within the Planning Area.

Specific route evaluations were not done for most of the Arizona Strip FO because route inventories are not yet complete. The Plan presents a preliminary route network of existing routes for analysis, pending completion of the inventory and application of the Route Evaluation Tree© method following the completion of this Plan. In the St. George Basin area, route inventory has been completed, but application of the Route Evaluation Tree© has not. A reasonable and foreseeable designation status for St. George Basin was developed and used for analysis.

Negligible: Impacts on travel and access would not be noticeable as there would be no discernible effect on miles of routes designated as open, limited in use, or completely closed. While a few roads could be improved or upgraded, overall road conditions would essentially remain the same.

Minor: Impacts on travel and access would be slightly noticeable in certain areas, although there would no substantive effect on the overall miles of routes designated as open, limited in use, or completely closed throughout the Planning Area. While numerous roads could be improved or upgraded, these would be site specific while the condition of most roads would essentially remain the same.

Moderate: Impacts on travel and access would be evident in many portions of Planning Area due to the overall miles of routes designated as open, limited in use, or completely closed. Changes in road conditions would be noticeable in certain portions of the Planning Area due to road improvement or upgrades.

Major: Impacts on travel and access would be extensive throughout the Planning Area due to the overall miles of routes designated as open, limited in use, or completely closed. Substantial numbers/miles of roads would be improved or upgraded, resulting in a noticeable change in road condition throughout the Planning Area.

Impacts to Travel Management

Impacts to Travel Management in the Planning Area would result from actions proposed under the following resource management programs:

- Travel Management
- Fish and Wildlife
- Special Status Species
- Cultural Resources (Arizona Strip FO only)
- Special Designations
- Recreation
- Lands and Realty (Arizona Strip FO only)

Alternative A: No Action

<u>Impacts from Travel Management</u>

Under Alternative A in the Monuments, vehicle travel would be allowed only on designated routes, with no areas of the Monument being open to motorized and mechanized cross-country vehicle travel, with the exception of authorized administrative and emergency purposes. Out of 1,825 miles of routes identified in Parashant during the baseline route inventories, 1,715 miles would be designated as open to the public and 25 miles would be designated open to administrative use only. Out of 565 miles of routes identified in Vermilion during the baseline route inventories, 446 miles would be designated as open to the public and 14 miles would be designated open to administrative use only. It should be noted that route designations, under any alternative, are implementation decisions and that the resulting transportation network could change over time with or without a plan amendment.

Travel through the Monuments is expected to increase due to the growing population in the communities and counties surrounding the Planning Area (see Socioeconomic section) and the increased demand for recreation opportunities on public lands (see Recreation section). In the long term, travelers could experience increases in traffic on designated routes due to increased use. Impacts would be minor in the short-term but could become moderate to major in the long term. The management actions of limiting travel to designated roads and allowing no new motorized route construction, which could otherwise address increased use, would exacerbate this impact. In addition, some designated routes could be closed if unacceptable impacts to resources/Monument objects are determined, further increasing demand for the remaining open routes. Finally, designated routes would not be upgraded or enhanced to address potential increases in traffic. This could increase the number of conflicts and traffic accidents on certain, heavily used routes.

Of 1.98 million acres of BLM lands in the Arizona Strip FO, vehicle travel would be limited to designated roads and trails on 282,019 acres and limited to existing roads and trails on 1,575,140 acres. Eight hundred and three acres would be open to motorized and mechanized vehicle use while 123,100 acres would be closed.

Travel through the Arizona Strip FO is expected to increase due to the growing population in the communities and counties surrounding the Planning Area (see Socioeconomic section) and the increased demand for recreation opportunities on public lands (see Recreation section). The greatest demand for access would occur near communities. One of the demands would be for more access to open areas for OHV use. The 803 acres of open area proposed under Alternative A would not be enough to meet such demand.

In the long term, travelers in the Arizona Strip FO could experience increases in traffic on designated routes due to increased use. Permitting public travel on both designated and existing roads and trails would alleviate traffic and conflicts. New motorized route construction (the minimum necessary to achieve Plan provisions) could reduce potential traffic and conflicts even further. However, designated and existing routes would not be upgraded or enhanced to address potential increases in traffic. This could increase the number of conflicts and traffic accidents on certain, heavily used routes.

Impacts from Fish and Wildlife

No management actions within the fish and wildlife program proposed under Alternative A would affect travel and access.

Impacts from Special Status Species

Restrictions placed on protecting desert tortoises could affect travel within desert tortoise habitat in both Parashant and the Arizona Strip FO. Specific transportation and access restrictions

would occur within the Pakoon DWMA and desert tortoise ACECs, including not allowing new paved roads; limitations on temporary upgrading of existing roads; seasonal restrictions on the regular maintenance of existing roads; and speed limits (at or below 40 mph) for BLM-authorized projects traveling on unpaved, high density tortoise areas during the species active season. Outside the Pakoon DWMA and desert tortoise ACECs but within desert tortoise habitat, use of roads constructed for specific non-public purposes, such as access routes to microwave towers, would be limited to administrative use only and temporary access routes would be modified as necessary to prevent further access. These restrictions would have minor, site-specific impacts on travel and access in Parashant and the Arizona Strip FO.

Impacts from Cultural Resources

In cultural ACECs in the Arizona Strip FO, travel would be limited to designated roads and trails or limited to existing roads and trails until route designation is complete. Restrictions would also be placed on OHV travel. Portions of the Old Spanish NHT on BLM lands would be closed to unauthorized vehicles where protected archaeological and historic sites and trail route segments are negatively impacted. Overall impacts to travel and access would be site specific and minor due to the relatively small area impacted and the limited number of roads potentially closed.

Impacts from Special Designation

In all three planning areas, various restrictions on travel would be implemented in wilderness areas and wild and scenic study corridors. In actuality, these two special designations overlap. In wilderness areas, all motorized vehicles, motorized equipment, aircraft landing, and other forms of mechanical transport (including mountain bikes and wheeled game carriers) would continue to be prohibited, except for necessary administrative purposes, emergency situations, or exercise of a private existing right or other special provision. In the Paria River wild and scenic river study area and the “wild” section of the Virgin River, the construction of new roads would be prohibited. Impacts would be minor considering no existing routes would be impacted.

In DWMAs/ACECs, specific restrictions would be applied on road construction, maintenance, and travel. The majority of such restrictions would occur in desert tortoise DWMAs/ACECs. Impacts would be minor considering the limited number of existing routes impacted.

Impacts from Recreation

Under Alternative A, the BLM would continue to write sign plans addressing present and future needs, including road information and public safety. Such sign plans would be coordinated with the Arizona Strip visitor map. This would benefit visitors traveling in the Planning Area by reducing numbers of lost or stranded travelers and preventable accidents. Impacts would be minor.

Impacts from Lands and Realty

The disposal of up to 25,188 acres in the Arizona Strip FO would reduce the overall amount of BLM lands available to the public to access. Due to the relatively small amount of acres involved, none of which are high use areas, impacts would be minor and site specific. Legal vehicular access would be acquired from willing sellers across private and state lands in locations determined in need of such access. This would improve access to those individuals and agencies requiring such access. Impacts would be minor and site specific.

Alternative B

Impacts from Travel Management

As under Alternative A, vehicle travel would be allowed only on designated routes in the Monuments, with no areas being open to motorized and mechanized cross-country vehicle travel, with the exception of authorized administrative and emergency purposes. However, significantly less than half the miles of routes (37 percent) would be open to public motorized use compared to Alternative A. This would result in a major impact to travel and access within and across the Monuments. The recreating public would be particularly susceptible to experience these impacts. Impacts to ranchers, researchers, federal and state agencies (e.g., BLM, NPS, USFWS, AGFD, etc) would be less intense due to the miles of routes designated open to administrative use only, the most of which would be designated under Alternative B compared to the other alternatives.

The potential for traffic, accidents, and conflicts experienced by travelers on designated routes in the Monuments would be considerably greater than that experienced under Alternative A due to the limited miles of routes open to the public in conjunction with the management action allowing no new motorized route construction. Impacts would be further intensified as, similar to Alternative A, some designated routes could be closed if unacceptable impacts to resources/Monument objects are determined and designated routes would not be upgraded or enhanced to address potential increases in traffic. Overall impacts from such travel management actions would be moderate in the short term, but could become major in the long term as visitation to the Monuments increases.

In the Arizona Strip FO under Alternative B, OHV-area designations would limit motorized and mechanized vehicle travel to designated roads and trails on over six times more acres than under Alternative A, and there would be no areas where travel would be limited to existing routes. Overall impacts would be major in the long term, especially considering the expected continued increases in travel in the Arizona Strip FO, which could increase the number of conflicts and traffic accidents on certain, heavily used routes. The ability to upgrade routes to address public safety issues, however, would partially alleviate problems related to increases in traffic on some routes.

No parts of the Arizona Strip FO would be open to motorized and mechanized vehicle use under Alternative B, while 30,452 (25 percent) fewer acres would be closed to motorized and mechanized vehicle use compared to Alternative A. Off-road users would need to find areas outside the Arizona Strip FO to travel off road. The impact would only be moderately more intense than under Alternative A due to the minimal number of open acres proposed under Alternative A, which would also require off-road enthusiasts to seek areas outside the Arizona Strip FO for off-road travel.

In the Ferry Swale area, there would be 18 fewer miles open to the public for motorized use, or 35 percent the routes open compared to Alternative A, reducing access into those areas. Impacts would be moderate. Impacts would be greatest on motorized recreationists, tourists, and other non-administrative users within the area while impacts to administrative users would be moderate due to the increase of 14 miles of routes being open for administrative use only in Alternative A. A total of 7 miles of roads would be closed and rehabilitated in the Ferry Swale area. All users would be affected. Impacts would be site specific and minor to moderate.

The impacts of a preliminary route network within the remainder of the Arizona Strip FO would be essentially the same as proposed under Alternative A. Administrators, emergency personnel, and individuals with a valid existing right or other valid authorization would be allowed to engage in cross-country motorized or mechanized travel. Additional route designations would occur over the first five years of the plan using the Route Evaluation Tree© process.

Impacts from Fish and Wildlife

In the Monuments under Alternative B, non-motorized access to public lands with fish and wildlife hunting and viewing opportunities would be maintained, though motorized modes would be greatly reduced. Impacts would be site specific and range from negligible to major. In all three planning areas, access to public lands with sensitive wildlife and fisheries resources would be closed or limited. Impacts would be site specific and minor.

Impacts from Special Status Species

Impacts from the protection of desert tortoises in Parashant and the Arizona Strip would be the same as described under Alternative A. In addition, active management programs could be undertaken to maintain or restore listed species and their habitats in all three planning areas, which could include the control of detrimental visitor access. This could affect access in site-specific locations. Impacts would be minor.

Under Alternative B, in addition to closing roads and trails that may cause desert tortoise mortality in the Arizona Strip FO, as proposed under Alternative A, the BLM could also close those roads causing or contributing to the individual mortality of any listed species or degradation of their habitat. Such management actions would increase the possibility of roads being closed; however, impacts would be minor as few roads would be expected to be closed.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Special Designations

The types of impacts due to travel restrictions in wilderness areas, rivers determined suitable for inclusion in the National Wild and Scenic Rivers system, DWMAs, and ACECs would be the same as described under Alternative A. This is true even in Parashant where the Pakoon ACEC/DWMA would lose its ACEC designation but keep its DWMA designation, which poses the same restrictions on travel as the ACEC. However, overall impacts due to travel restrictions in ACECs would be more widespread in the Arizona Strip FO due to the creation of additional ACECs and expansion of existing ones. When added, 308,390 acres would be under ACEC protection under Alternative B, which is over twice as many acres than proposed under Alternative A.

Impacts from Recreation

Impacts would be similar to that described under Alternative A. Additionally, management of new SRMAs could constrain or restrict public access in certain recreation management zones (RMZs) within the SRMAs, or enhance or encourage greater public access in other RMZs. The overall impact would be minor to moderate on a localized basis.

Impacts from Lands and Realty

In the Arizona Strip FO under Alternative B, 1,507 fewer acres would be identified for disposal than under Alternative A, which would result in negligible difference in impacts. Legal vehicle access would be acquired from willing sellers across private and state lands in similar locations as described under Alternative A, resulting in similar impacts.

Alternative C

Impacts from Travel Management

As under Alternative A, vehicle travel would be allowed only on designated routes, with no areas of the Monument being open to motorized and mechanized cross-country vehicle travel, with the exception of authorized administrative and emergency purposes. However, there would be 395 fewer miles of routes open to the public for motorized use in Parashant and 72 fewer miles of routes open to the public for motorized use in Vermilion compared to Alternative A, reducing access into the Monuments. Impacts would be moderate. Impacts would not be as extensive compared to Alternative B as Alternative C proposes nearly twice as many miles of open routes in the Monuments. Impacts to ranchers, researchers, federal and state agencies would be

minimized due to 199 miles of routes in Parashant and 72 miles of routes in Vermilion designated open to administrative use only.

The potential for traffic, accidents, and conflicts experienced by travelers on designated routes would be greater than under Alternative A in the Monuments due to fewer miles of routes open to the public for motorized and mechanized vehicle use. As under Alternative A, some designated routes could be closed if unacceptable impacts to resources/Monument objects are determined. Differing from Alternative A and B, new motorized route construction (the minimum necessary to achieve Plan provisions) could occur on BLM lands. This could allow for some traffic alleviation not possible under Alternative A or B. In addition, designated routes could be upgraded or enhanced on BLM lands to address potential public safety concerns, such as those resulting from increased traffic, thus improving access. Impacts would be minor.

Under Alternative C in the Arizona Strip FO, OHV-area designations would limit motorized and mechanized vehicle use to designated roads and trails on over twice as many acres as under Alternative A, while travel would be limited to existing routes on 370,358 (24 percent) fewer acres than under Alternative A. These actions would slightly reduce the potential number of routes available for public access in the Arizona Strip FO. Closing 30,452 fewer acres to motorized and mechanized vehicle use compared to Alternative A would result in the same impacts as described under Alternative B. Impacts would be moderate. As under Alternative B, the ability to upgrade routes to address public safety issues would partially alleviate problems related to increases in traffic on some routes. In addition, new motorized routes could be constructed, although it would be the minimum necessary to achieve Plan provisions and thus only slightly increases the possibility of reducing congestion along some routes within the Arizona Strip FO.

Under Alternative C, 1,481 acres would be open to motorized and mechanized vehicle use, nearly twice as many acres in the Arizona Strip FO compared to Alternative A. This would increase opportunities for off-road access, although probably not sufficient to meet the increasing demand for off-road access for OHV and other uses. Impacts to off-road travelers would be minor.

Under Alternative C, 4 fewer miles of roads would be open to the public in the Littlefield and Ferry Swale areas compared to Alternative A, although 14 more miles would be open compared to Alternative B. Impacts would be greatest to recreationists, tourists, and other non-administrative users within the areas while opening 5 miles to administrative use only would minimize impacts to administrative users. Two miles of roads would be closed and rehabilitated, affecting all users. This impact would be site specific and minor, less intense when compared to Alternative B. Impacts would be minor to moderate. All users would be affected.

The impacts of a preliminary route network within the remainder of the Arizona Strip FO would be essentially the same as proposed under Alternative A. Administrators, emergency personnel, and individuals with a valid existing right or other valid authorization would be allowed to

engage in cross-country motorized or mechanized travel. Additional route designations would occur over the first five years of the Plan using the Route Evaluation Tree© process.

Impacts from Fish and Wildlife

Impacts would be the same as discussed under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Special Designations

In the Monuments, impacts would be the same as described under Alternative A. In the Arizona Strip FO, impacts would be the same as described under Alternative A, with the exception that impacts from ACECs would be more widespread due to the designation of 4,909 more acres under ACEC protection than under Alternative A. Impacts would not be as widespread compared to Alternative B.

Impacts from Recreation

Impacts would be similar to that described under Alternative B.

Impacts from Lands and Realty

Under Alternative C, 164 fewer acres in the Arizona Strip FO would be identified for disposal than under Alternative A, which would result in negligible difference in impacts. Other impacts would be the same as described under Alternative B.

Alternative D

Impacts from Travel Management

As under Alternative A, vehicle travel in the Monuments would be allowed only on designated routes, with no areas of the Monument being open to motorized and mechanized cross-country vehicle travel, with the exception of authorized administrative and emergency purposes. However, there would be 187 fewer miles of routes open to the public for motorized use in Parashant and 30 fewer miles of routes open to the public for motorized use in Vermilion compared to Alternative A, reducing access into the Monuments. Impacts would be minor to

moderate. Impacts would be less intense compared to Alternative B as Alternative D proposes over twice as many miles of open routes, and slightly less intense as under Alternatives C as Alternative D. The recreating public would be most susceptible to reduced miles of open routes as impacts to ranchers, researchers, and federal and state agencies would be minimized due to routes designated open to administrative use only.

The amount of traffic, accidents, and conflicts experienced by travelers on designated routes within the Monuments would be slightly greater than under Alternative A due to fewer miles of routes open to the public under Alternative D, although impacts would be less than under Alternatives B and C. Differing from Alternative A and B but similar to Alternative C, new motorized route construction could occur on BLM lands. The basis for building such routes would be more lenient than under Alternative C as routes could be built to support enhancing public use if protection and/or enhancement of Monument objects are ensured. More routes could thus be built, allowing for improved traffic conditions and easier access to certain parts of the Monuments. As under Alternative C, designated routes could be upgraded or enhanced on BLM lands to address potential public safety concerns, such as those resulting from increased traffic. Impacts resulting from the possibility of new motorized routes and improvement/ enhancement of existing routes would improve overall access into the Monument over the long term.

In the Arizona Strip FO under Alternative D, OHV-area designations would limit motorized and mechanized vehicle use to designated roads and trails on 87,563 more acres than under Alternative A, with travel being limited to existing routes on 63,488 (4 percent) fewer acres than under Alternative A. This would slightly reduce the potential number of routes available for public access in the Arizona Strip FO. Impacts from closing 30,452 fewer acres to motorized and mechanized vehicle use compared to Alternative A would be the same as under Alternative B. Impacts would be moderate. As under Alternative B, the ability to upgrade routes to address public safety issues would partially alleviate problems related to increases in traffic on some routes. In addition, new motorized routes could be constructed for the purposes of enhancing recreation opportunities, which increases the possibility of reducing route congestion in popular areas of the Arizona Strip FO.

Nearly nine times as many acres in the Arizona Strip FO would be open to motorized and mechanized vehicle use compared to Alternative A. This would greatly increase opportunities for off-road access, partly meeting the increasing demand for off-road access for OHV and other uses. Impacts to off-road travelers would be moderate.

One fewer mile of road would be open to the public in the Ferry Swale area compared to Alternative A, although 17 more miles would be open compared to Alternative B and 3 more miles compared to Alternative C, reducing the intensity of impacts. Impacts to administrative users would be minimized by 3 miles of roads open for administrative use only. One mile of road would be closed and rehabilitated. Although such closures would affect all users, it is the

least among the alternatives with the exception of Alternative A. Impacts would be minor to moderate. All users would be affected.

The impacts of a preliminary route network within the remainder of the Arizona Strip FO would be the same as proposed under Alternative A. Administrators, emergency personnel, and individuals with a valid existing right or other valid authorization would be allowed to engage in cross-country motorized or mechanized travel. Additional route designations would occur over the first 5 years of the Plan using the Route Evaluation Tree© process.

Impacts from Fish and Wildlife

Impacts would be the same as discussed under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Special Designations

In the Monuments, impacts would be the same as described under Alternative A. In the Arizona Strip FO, impacts would be the same as described under Alternative A, albeit less widespread due to several ACECs losing their designations. A total of 106,420 acres would be under ACEC designation under Alternative D, which is 20,772 less acres than under Alternative A.

Impacts from Recreation

Impacts would be similar to that described under Alternative B.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative C.

Alternative E: Proposed Plan

Impacts from Travel Management

As under Alternative A, vehicle travel in the Monuments would be allowed only on designated routes, with no areas being open to motorized and mechanized cross-country vehicle travel, with the exception of authorized administrative and emergency purposes. However, there would be

311 fewer miles of routes in Parashant and 69 fewer miles of routes in Vermilion that would be open to the public compared to Alternative A, reducing access into the Monuments. Impacts would be moderate, minimal compared to Alternative B that proposes less than half as many miles of open routes. Impacts from closed roads would fall somewhere between Alternatives C and D. As under all alternatives, the recreating public would be particularly susceptible to experience impacts while impacts to ranchers, researchers, federal and state agencies would be minimized due to routes designated open to administrative use only.

The amount of traffic experienced by travelers in the Monuments would be slightly greater than under Alternative A due to fewer miles of routes open to the public. As under Alternative A, some designated routes could be closed if unacceptable impacts to resources/Monument objects are determined. Differing from Alternative A and B but similar to Alternatives C and D, new motorized route construction could occur on BLM lands. As a result, new routes could be built and allow for improved traffic conditions and easier access to certain parts of the Monument. As under Alternative C and D, designated routes could be upgraded or enhanced on BLM lands to address potential public safety concerns, such as those resulting from increased traffic.

In the Arizona Strip FO under Alternative E, OHV-area designations would limit motorized and mechanized vehicle use to designated roads and trails on almost seven times more acres than under Alternative A, with no travel limited to existing routes. Impacts from these decisions would be similar to those discussed under Alternative B. Impacts from closing 11,819 or 13 percent fewer acres to motorized and mechanized vehicle use would also be similar to those described under Alternative B. Impacts from BLM lands open to motorized and mechanized vehicle use would be seven times less than Alternative D due to 976 open acres, which would greatly increase opportunities for off-road access, partly meeting the increasing demand for off-road access for OHV and other uses. Impacts to off-road travelers would be moderate.

As under Alternative B, the ability to upgrade routes to address public safety issues in the Arizona Strip FO would partially alleviate problems related to increases in traffic on some routes. As under Alternative D, new motorized routes could be constructed for the purposes of enhancing recreation opportunities, which increases the possibility of reducing route congestion in popular areas of the Arizona Strip FO.

Impacts from route designations in the Ferry Swale area would be similar to that described under Alternative C due to similar miles of routes open, closed, and limited to administrative use.

The impacts of a preliminary route network within the remainder of the Arizona Strip FO would be the same as proposed under Alternative A. Administrators, emergency personnel, and individuals with a valid existing right or other valid authorization would be allowed to engage in cross-country motorized or mechanized travel on limited to existing areas only. Additional route designations would occur over the first five years of the plan using the Route Evaluation Tree© process.

Impacts from Fish and Wildlife

Impacts would be the same as discussed under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Special Designations

In the Monuments, impacts would be the same as Alternative A. In the Arizona Strip FO, impacts would be similar to Alternative A, albeit more widespread due to the designation of 150,105 acres of ACECs, but less widespread compared to Alternatives B and C.

Impacts from Recreation

Impacts would be similar to that described under Alternative B.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative C.

IMPACTS TO SPECIAL DESIGNATIONS

CONGRESSIONAL DESIGNATIONS: WILDERNESS AREAS

This section presents potential impacts to designated wilderness (BLM lands only) and proposed wilderness (NPS lands only) from the five alternatives, including the No Action Alternative. There are eight wilderness areas on BLM lands in the Planning Area: four are located in Parashant (Grand Wash Cliffs, Paiute, Mt. Logan, and Mt. Trumbull), a portion of one is located in Vermilion (Paria Canyon-Vermilion Cliffs), and three are located in the Arizona Strip FO (Cottonwood Point, Kanab Creek, and Beaver Dam Mountains). There are seven proposed wilderness areas on NPS lands in Parashant: Azure Ridge, Cockscomb, Balanced Rock, Shivwits, Andrus, Whitmore Point, and Lava. See Chapter 3 for a description of these areas.

This section analyzes management actions that influence those opportunities associated with wilderness character (i.e., solitude, naturalness, and primitive/unconfined recreation). Wilderness character is primarily influenced by the proximity of motorized travel corridors and the volume and density of recreational users. To a lesser extent, range and wildlife management

projects can affect wilderness character. These impacts normally come from vegetation treatments and the installation, maintenance, and use of range/wildlife catchments and wildlife drinkers. These impacts can be negative, such as the loss of naturalness or solitude, or positive, such as the enhancement of wildlife populations within a wilderness area.

Methods and Assumptions

The analysis of potential impacts to BLM-designated and NPS-proposed wildernesses is based on two data sources: visitor use reporting statistics, which in many cases provides detailed information on the number and types of recreational use within a wilderness area; and spatial data from the GIS. The GIS information used in this analysis includes wildlife habitat boundaries, range and wildlife developments, management units, wilderness boundaries, areas with wilderness characteristics, transportation inventories, transportation designations, ecological zones, watersheds, vegetation types, and known historical/cultural sites. In the absence of data, analyses were based on the expertise of recreation/wilderness planners.

Impacts are quantified where possible. In the absence of quantifiable data, professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate. The intensities of impacts are also described, where possible, using the following guidance:

Negligible: The impact is at the lower level of detection; there would be no measurable change.

Minor: The impact is slight but detectable; there would be a small change.

Moderate: The impact is readily apparent; there would be a measurable change that could result in a small but permanent change.

Major: The impact is severe; there would be a highly noticeable, long-term, or permanent measurable change.

The following assumptions regarding the future management of designated wilderness are made:

- All laws for the management and protection of wilderness would be followed, to the extent allowed by the budget and available personnel.
- Any new surface disturbing activities proposed would be subject to NEPA analysis and to the minimum tool requirement
- Activities proposed that would not initially meet wilderness objectives for the area would be mitigated to the extent needed to meet the objectives. Activities that could not be mitigated would not be authorized.
- Some proactive restoration of areas that do not meet desired wilderness objectives may be completed each year.

Impacts to Wilderness

Impacts to wilderness settings would result from actions proposed by the following resource management programs:

- Travel Management
- Wilderness Characteristics
- Vegetation and Fire and Fuels Management
- Fish and Wildlife
- Special Status Species
- Visual Resources
- Cultural Resources
- Special Designations
- Livestock Grazing
- Recreation
- Interpretation and Environmental Education
- Lands and Realty

Alternative A: No Action

Impacts from Travel Management

The current route system would be maintained and 1,715 miles of routes in Parashant, 446 miles in Vermilion, and 4,934 miles in the Arizona Strip FO would remain open to motorized and mechanized travel by the public. This includes all routes that lead directly to, or run parallel to, designated wilderness areas. Solitude in these wilderness areas would be impacted due to the proximity of open routes, and naturalness in these areas could continue to be impacted by illegal motorized intrusions. These impacts would primarily stem from OHV traffic and would remain minor, localized, and direct in the Monuments due to the remote nature of the area. In the Arizona Strip FO, impacts would become more severe in the long term due to the expanding population in Southern Utah, the corresponding increase in OHV sales, and the proximity of some areas within the Arizona Strip FO to populated areas.

Impacts from Wilderness Characteristics

No decisions regarding wilderness characteristics are proposed under Alternative A.

Impacts from Vegetation and Fire and Fuels Management

Any vegetation treatments proposed within designated or proposed wilderness could have minor to moderate impacts. Any projects would be under the minimum tool requirement, and impacts would likely be localized and short-term. Solitude experienced by recreational users could be

affected by short-term minor to moderate impacts while work was being conducted. Naturalness would be impacted at the minor to moderate level, depending on the type and scope of work. All impacts would be localized.

In Parashant, active restoration projects in wilderness areas would have a localized impact and a generally short-term effect on solitude, naturalness, and primitive/unconfined recreation, depending on the scope of the project. Long-term benefits would be realized by active restoration (within the minimum tool restriction) as having a full suite of restoration tools would allow an aggressive approach to controlling invasive species.

Impacts from Fish and Wildlife

Wildlife transplants could create a temporary loss of solitude during the release of bighorn and other species in wilderness areas. This impact could be offset by having restored native animal populations as a supplemental wilderness value.

Currently, there are 14 developed wildlife drinkers/catchments within designated wilderness in Parashant and 10 in the Arizona Strip FO. There are an additional eight drinkers/catchments in Parashant and two in the Arizona Strip FO within 1,000 feet of a wilderness or proposed wilderness boundary. These water developments would continue to serve wildlife populations throughout the two planning areas. Under Alternative A, motorized access to 16 drinkers/catchments in Parashant and eight in the Arizona Strip FO would continue. Construction and maintenance of these or other water development projects in Parashant and the Arizona Strip FO would have minor to moderate impacts on wilderness experiences in these locations by diminishing naturalness and the opportunity for primitive/unconfined recreation. Such impacts would be direct and localized, rarely extending more than 100 feet in any direction.

In Vermilion, there is one wildlife drinker within the Paria Canyon-Vermilion Cliffs Wilderness boundary and five Wildlife/Range water development projects within 1,000 feet of the wilderness boundary. These water developments mainly serve bighorn and mule deer populations on the Paria Plateau and the wilderness. Under Alternative A, motorized access to these sites would be maintained. The disturbed area for these projects often extends into the wilderness and is usually the result of livestock concentrations around the water development. These areas are characterized by disturbed soil, sparse vegetation, and large quantities of cow manure. The construction and maintenance of water development projects can have moderate to major impacts on designated wilderness. Naturalness and the opportunity for primitive/ unconfined recreation in these locations are diminished considerably. These impacts are direct and long term but are very localized, rarely extending more than one-half mile in any direction.

Impacts from Special Status Species

No special status species decisions proposed under Alternative A for the Monuments would affect designated or proposed wilderness areas. In general, the management of special status

species' habitat in the Arizona Strip FO would involve restrictions that have a positive effect on wilderness character. Restrictions on fire use and vegetation treatment can often enhance the naturalness of wilderness. The Beaver Dam Mountains, Paiute, and Kanab Creek wilderness all contain habitat that falls into this category. The impacts would generally be minor and positive.

Impacts from Visual Resources

Wilderness and visual resources are generally compatible as designated and proposed wilderness is normally associated with a high visual quality. Under Alternative A, all designated wilderness areas within the Monument would be designated VRM Class 1, which prohibits any development that would cause negative impacts to solitude, naturalness, and primitive/unconfined recreation. Conflicts sometimes occur when wilderness is bordered by lower VRM classes. Under this alternative, approximately 40 percent of the Grand Wash Cliffs Wilderness would be bordered by VRM Class IV, while portions of the Paiute and Beaver Dam Mountains wilderness would be bordered by VRM classes III and IV, which would allow development within sight of the wilderness boundary. These impacts would be indirect and minor. The other wilderness areas are bordered by VRM Class 2, which does not present such a problem.

Most of NPS proposed wilderness is bordered by designated wilderness in Grand Canyon National Park and BLM Mt. Logan Wilderness. Other areas are adjacent to the BLM lands are managed as VRM Class II, however, the remote nature of these lands and routes would have indirect, minor, localized impacts from VRM.

Impacts from Cultural Resources

No cultural resources decision proposed under Alternative A would affect designated or proposed wilderness areas in Parashant and the Arizona Strip FO. In Vermilion, designating the Honeymoon Trail as a public use site could increase the interest in and the use of this trail. Since the Honeymoon Trail runs along the southern boundary of the Paria Canyon-Vermilion Cliffs Wilderness, an increase in the number of motorized and non-motorized visitors could have both positive and negative impacts on the wilderness. Increased visitation increases the potential for vehicular intrusions and degradation of solitude and naturalness. Impacts are expected to be minor. A larger number of visitors could also have a positive impact, providing an opportunity for appropriate wilderness education.

Impacts from Special Designations (Wilderness and Wild and Scenic Rivers)

Updating wilderness management plans under Alternative A could clarify future management and have the potential to protect and enhance wilderness character. Continuing VRM Class 1 designations to designated wilderness areas would protect wilderness character (see Impacts from Visual Resources).

Wild and scenic river designation generally complements designated wilderness, adding another layer of protection to the scenic nature of the landscape and other outstandingly remarkable values. However, applying wild and scenic river status could increase the amount of recreational traffic in the Paria and Virgin river corridors located in wilderness, affecting naturalness and solitude. Current visitor use limits in the Paria would limit these impacts to negligible. Overall, classifying the Paria and Virgin rivers as suitable for wild and scenic river designation would have long-term, positive impacts on the affected wilderness areas.

Impacts from Livestock Grazing

Livestock grazing in general can have a negative impact on wilderness character. Both solitude and naturalness can be impacted by the presence of livestock in a wilderness setting. Even with a well-managed grazing program, typical recreational wilderness users have a negative attitude towards livestock grazing. In general, grazing impacts to wilderness character are direct, localized, and can range from minor to moderate.

The Pakoon Allotment incorporates about 50 percent of the Grand Wash Cliffs Wilderness. Under Alternative A, the allotment would be available for grazing from November 1 through June 15 in the area not included in the Pakoon DWMA, which is the least restrictive among the alternatives. Wilderness users are generally in the Grand Wash Cliffs Wilderness during the spring, which includes the latter part of the grazing period. Livestock grazing during this period could have a minor impact on solitude and a slightly larger impact on naturalness. Areas frequented by livestock, like those around water developments, often have a distinctly unnatural appearance, and could affect wilderness users and their perception of naturalness.

Under Alternative A, grazing would be authorized year round in the Tuweep Allotment. Livestock grazing impacts to solitude and naturalness in the Mt. Trumbull Wilderness would be minor.

Current seasonal restrictions on the Lees Ferry allotment have direct but minor impacts on solitude and naturalness. Very few hikers are in Paria Canyon during the period when the allotment is grazed. It should be noted that any livestock seen in Paria Canyon generate considerable public criticism. While impacts to the resource may be minor, the perception of greater impacts can be expected.

The Cedar Wash Allotment incorporates a majority of the Beaver Dam Mountains Wilderness. Under the current use cycle, the allotment is available for grazing from Oct. 15 through March 15 in the area outside the desert tortoise ACEC. Ephemeral extensions are authorized through May 15. The Mesquite and Littlefield Community Allotments incorporate a large portion of the Paiute Wilderness. Under the current use cycle, grazing is allowed yearlong in that area outside the desert tortoise ACEC. Wilderness users are generally in these wilderness areas during the winter and spring, when the allotment is grazed . Livestock grazing during this period could have a minor impact on solitude and a slightly larger impact on naturalness. Areas frequented by

livestock, like those around water developments, often have a distinctly unnatural appearance, and could impacts wilderness users and their perception of naturalness. Overall, Alternative A is the least restrictive of the alternatives and would result in the greatest or most widespread impacts.

Impacts from Recreation

Geocaching: No geocache decisions are proposed under Alternative A.

Recreation Marketing Actions: The production of maps, brochures, and other information regarding recreation opportunities would have a positive impact because such publications would allow the BLM and NPS to educate potential users about specific rules, regulations, and guidelines. The dissemination of such information would also increase user safety in designated wilderness areas. Minor impacts could occur, however, because any promotional efforts could increase the number of users.

Signing and Facilities: Minor new facilities (toilets, information kiosks, and directional signs) when placed at trailheads would have a positive impact on designated and proposed wilderness. Visitor education on "Leave No Trace" ethics and area-specific rules and regulations would serve to create better-informed wilderness users.

Inventory and Monitoring: No inventory and monitoring decisions are proposed under Alternative A.

Visitor Use Reporting: Continuing visitor use tracking and data compilation would have a positive effect on designated and proposed wilderness.

Visitor Limits and Regulations: Adjusting visitor use limits only when the monitoring of resource and social conditions indicate a downward trend would have a short-term positive effect on designated and proposed wilderness. In the long term, those impacts would be magnified; dealing with each impact as a single, unique problem rather than analyzing them holistically would negate the opportunity to solve problems before they become unmanageable.

Outfitters and Guides: No outfitters and guides decisions are proposed under Alternative A.

Recreational Stock Use: Prohibiting the use of horses in Paria Canyon above Bush Head Canyon would have a positive, direct effect on solitude, naturalness, and primitive/unconfined recreation. Soil disturbance, vegetation degradation, and hiker conflicts would be eliminated in this area.

Impacts from Interpretation and Environmental Education

No interpretation and environmental education decisions are proposed under Alternative A.

Impacts from Lands and Realty

Non-federal land and easement acquisitions would have a positive impact on wilderness areas.

Alternative B

Impacts from Travel Management

Under Alternative B, 445 miles of routes in Parashant and 179 miles of routes in Vermilion would be closed to motorized and mechanized use by the public, and 692 miles in Parashant and 211 miles in Vermilion would be limited to administrative use only. Of these routes, 289 miles in Parashant and 114 miles in Vermilion lead directly to, run parallel to, or are within the boundaries of designated wilderness or NPS proposed wilderness. Because of these closures, the impacts to wilderness from motorized travel would be considerably less when compared to the other alternatives, especially Alternative A. Solitude and naturalness would be enhanced due to route closures in proximity to wilderness. These route closures would be effective in the long term but would likely be ineffective and difficult to implement in the short term. The closed routes would be allowed to rehabilitate naturally, leaving them visible to the public for some time. Because so many routes would be closed under this alternative, providing adequate barriers to restrict access would be difficult. As a result, unauthorized use of many of these routes would likely continue impacting wilderness experiences.

The current route system would be maintained until routes on Arizona Strip FO lands are officially designated. Currently, there are 4,934 miles of routes within the Arizona Strip FO that are open to motorized use. Until such designation occurs, impacts would be the same as under Alternative A. It is expected that when route evaluation and designation occurs for the Arizona Strip FO lands, the public process will consider a range of alternatives, each having its own emphasis. One alternative could be similar to that of Alternative B in this Plan, which is an emphasis on minimal human use/influence, and the fewest miles of open roads and trails. It also focuses on natural processes and other unobtrusive methods for ecosystem restoration, resource management, and scientific research; more protection and enhancement of remoteness and dispersed recreation; unstructured recreation opportunities; and the least amount of motorized recreation opportunities.

Impacts from Wilderness Characteristics

Under this alternative, areas identified for maintaining wilderness characteristics could have a moderate impact on designated or proposed wilderness areas. Many of the areas where wilderness characteristics would be maintained are adjacent to BLM designated and NPS proposed wilderness areas under Alternative B. Maintaining wilderness characteristics near these wilderness areas would not be done as a means to “buffer” them from non-wilderness resource uses and practices. However, managing areas for maintenance of wilderness

characteristics as a "stand-alone" effort, not tied in any way to wilderness management, would retain existing resource and social conditions that indirectly reduce the potential for non-wilderness resource use activities to produce noticeable sights and sounds of human activity as experienced from within the wilderness areas. These impacts would be long term, indirect, and greater in this alternative compared to all other alternatives as Alternative B proposes the most acres (554,187) for maintaining wilderness characteristics.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative A, with the exception that long-term benefits using natural restoration processes in Parashant would be greatly reduced as the ability to control invasive species would be mostly ineffective.

Impacts from Fish and Wildlife

Impacts from wildlife transplants and wildlife drinkers/developments would be the same as described under Alternative A.

Vegetation treatment projects for wildlife could result in a temporary loss of solitude due to an increase in the dust, noise, and general activity associated with vegetation treatments. These impacts would be direct, localized, and short-term.

Impacts from Special Status Species

Minimizing surface disturbance in special status species habitat during fire suppression activities could have a positive impact on designated wilderness by enhancing naturalness. Reintroduction of special status species could result in minor, direct, and localized impacts to solitude, depending upon the species and its use of vegetation and other habitat features.

Impacts from Visual Resources

Under Alternative B, all wilderness areas within Parashant would be designated VRM Class 1, while the remainder of the Monument would be designated VRM Class 2. This would protect wilderness character by eliminating the conflict of Grand Wash Cliffs Wilderness being bordered by VRM Class 4 that was discussed under Alternative A. In the Arizona Strip FO, only a small portion adjacent to the Paiute Wilderness would be designated VRM Class III, making this alternative the most protective of wilderness character.

Impacts from Cultural Resources

Cultural field inventories proposed under Alternative B could have a temporary short-term impact on solitude and primitive/unconfined recreation opportunities. There could be a longer-term effect on naturalness, depending on the extent of the inventories.

Impacts from Honeymoon Trail designation are the same as under Alternative A. The same can be said for the Notch cultural site, which is located inside the Paria Canyon-Vermilion Cliffs Wilderness boundary, except that the impacts are expected to be direct, localized, and moderate in scale. A larger number of visitors mean a greater number of potential wilderness intrusions and a greater potential for degradation in solitude and naturalness. A larger number of visitors could also have a positive impact as more visitors mean greater potential for appropriate wilderness and cultural education.

Designating the Old Spanish NHT could have minor impacts to the Beaver Dam Mountain and/or Paiute wildernesses. The trail generally follows the Interstate 15 corridor between the two wilderness areas. Minor impacts to naturalness could occur if the trail is marked and it is found that it crosses either wilderness boundary.

Impacts from Special Designations (Wilderness and Wild and Scenic Rivers)

Impacts would be the same as described under Alternative A, with the exception that expanding the fee demonstration area to include the "Teepees" (in the Paria Canyon-Vermilion Cliffs Wilderness) would further protect solitude and naturalness by placing restrictions upon the number of people moving through the fee demonstration area.

Impacts from Livestock Grazing

Overall impacts from livestock grazing would be the same as described under Alternative A, although impacts would be reduced or eliminated in those allotments assigned with seasonal restrictions or made unavailable to grazing. Impacts from livestock grazing in the Mt. Trumbull Wilderness would be eliminated under Alternative B by making the Tuweep Allotment unavailable to grazing. Grazing in the Pakoon Allotment would be authorized from October 15 through March 15 within the Pakoon WHA, which is the most restrictive among the alternatives. Not only does this limit impacts by reducing the overall grazing period by three and a half months, it also excludes grazing during the main user season, which generally begins in the spring. As a result, livestock grazing during the time period proposed under Alternative B would only have a negligible impact on solitude and may have a minor impact on naturalness that extends into the spring. Wilderness users' perception of naturalness would continue to be impacted by areas frequented by livestock, such as around water development, even after the livestock have been removed from the area.

In Vermilion, making the river pasture of the Lees Ferry Allotment unavailable to grazing would have a positive, long-term impact on solitude and naturalness in the Paria Canyon-Vermilion Cliffs Wilderness, as well as preserve the public's perception of wilderness character.

Under the proposed use cycle in the Cedar Wash and Littlefield Community allotments in the Arizona Strip FO, grazing would be allowed from Oct. 15 through March 15 in that area outside

the desert tortoise ACEC. Ephemeral extensions would not be authorized. Wilderness users are generally in the Beaver Dam Mountains and Paiute wildernesses during the winter and spring, which includes the authorized grazing period. Livestock grazing during this period could have a minor impact on solitude and a slightly larger impact on naturalness. Areas frequented by livestock, like those around water developments, often have a distinctly unnatural appearance, and could impact wilderness users and their perception of naturalness. This is the most restrictive alternative and would cause the least impact on wilderness character.

Impacts from Recreation

Impacts from recreation marketing actions and signing and facilities would be the same as described under Alternative A.

Geocaching: Immediate removal of geocache sites if impacts to Monument objects or designated wilderness were apparent would have a generally positive impact. This action could also alienate a very active and normally compliant geocaching community.

Inventory and Monitoring: The information developed thorough inventory and monitoring would have a positive impact on designated or proposed wilderness. It could be used to assess management strategies, later decisions, change implementation, or maintain current management direction.

Visitor Use Reporting: Any visitor use tracking and data compilation would have a positive effect on designated or proposed wilderness.

Visitor Use, Carrying Capacity, and LAC: Establishing mandatory carrying capacity limits in intensive use areas would reduce or maintain the number of users, having a positive effect on designated or proposed wilderness. These impacts would be indirect.

Outfitters and Guides: Providing outfitters and guides with annual training on wilderness ethics would have a positive effect on designated or proposed wilderness.

Recreation Stock Use: Prohibiting the use of horses in Paria Canyon would have a positive effect on solitude, naturalness, and primitive/unconfined recreation. Soil disturbance, vegetation degradation, and hiker conflicts would be eliminated.

Impacts from Interpretation and Environmental Education

Supporting education and outreach programs like “Tread Lightly” and “Leave No Trace” would have a positive impact on designated and proposed wilderness.

Impacts from Lands and Realty

Acquisition of surface ownership lands and sub-surface mineral estate would have positive long-term impacts on wilderness areas and adjacent lands.

Alternative C

Impacts from Travel Management

Under Alternative C, 224 miles of routes in Parashant and 110 in Vermilion would be closed to motorized and mechanized vehicle use by the public and an additional 199 miles in Parashant and 72 miles in Vermilion would be limited to administrative use. Of these routes, 286 miles in Parashant and 42 miles in Vermilion lead directly to, run parallel to, or are within designated wilderness or proposed wilderness. Solitude and naturalness would be enhanced due to the closures in proximity to wilderness compared to Alternative A, although to a considerably lesser degree compared to Alternative B. However, in comparison to Alternative B, route closures under Alternative C would be more effective in the short term because routes would be rehabilitated through the use of both natural and mechanical methods.

The current route system would be maintained until routes on Arizona Strip FO lands are officially designated. Currently, there are 4,934 miles of routes within the Arizona Strip FO that are open to motorized use. Until such designation occurs, impacts would be the same as those described under Alternative A. It is expected that when route evaluation and designation occurs for Arizona Strip FO lands, the public process will consider a range of alternatives, each having its own emphasis. One alternative could be similar to that of Alternative C in this Plan, which represents an attempt to balance resource protection and human use/influence. It proposes a moderate amount of open roads and trails; mix of natural processes and “hands-on” techniques for ecosystem restoration, resource management, and scientific research; and a mix of motorized, non-motorized, dispersed, and structured recreation opportunities.

Impacts from Wilderness Characteristics

Although 226,394 acres of Parashant areas proposed for maintenance of wilderness characteristics in Alternative C is approximately 44 percent less than under Alternative B, the acres that are adjacent to existing wilderness areas would be almost identical. With the exception of two open routes directly east of the Grand Wash Cliffs Wilderness, one open route at the north end of the Mt. Logan Wilderness, and three open routes leading to NPS proposed wilderness, the impacts would be the same as described under Alternative B.

In Vermilion under Alternative C, areas where wilderness characteristics would be maintained could have a moderate to major impact on the Paria Canyon-Vermilion Cliffs Wilderness. These impacts would be only slightly less than under Alternative B, and be both long term and indirect. On the Paria Plateau, areas with wilderness characteristics lie adjacent to much of the Paria

Canyon-Vermilion Cliffs Wilderness. Along 52 miles of the wilderness boundary on the plateau, the "wilderness core" would remain more distant from the nearest designated roads, as no new permanent roads would be authorized in areas where wilderness characteristics would be maintained. In the Ferry Swale area, six miles of wilderness boundary would be affected in the manner described.

Impacts would be the same as described under Alternative B for the Arizona Strip FO. While the overall acreage of areas with wilderness characteristics would increase/decrease by alternative, the areas adjacent to Kanab Creek Wilderness and Paiute Wilderness would remain unchanged.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative A.

Impacts from Fish and Wildlife

Impacts from wildlife transplants and wildlife drinkers/developments would be the same as described under Alternative A. Impacts from vegetation treatment projects would be the same as under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Visual Resources

Impacts in Parashant would be similar to that described under Alternative A, with the exception that the VRM Class IV areas around the Grand Wash Cliffs Wilderness would be designated as VRM Class III. This would reduce the impacts discussed under Alternative A.

Impacts in Vermilion would be the same as described under Alternative A, while impacts in the Arizona Strip FO would be similar to that described under Alternative B, with a slight increase (4,045 acres) in VRM Class III areas adjacent to the Paiute Wilderness.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B.

Impacts from Special Designations (Wilderness and Wild and Scenic Rivers)

Impacts would be the same as described under Alternatives B.

Impacts from Livestock Grazing

Overall impacts from livestock grazing would be the same as under Alternative A. Impacts from grazing in the Pakoon Allotment in Parashant would be similar to that described under Alternative B, with the exception that the season of use would extend one month longer, to April 15, which includes the beginning of the visitor season. Ephemeral extensions could extend use to May 15, further extending grazing into the visitor season, and thus increasing impacts on solitude compared to Alternative B. Impacts would be minor and remain less intense when compared to Alternative A.

The creation of a forage reserve on the Tuweep and Parashant allotments in Parashant would have a negligible impact on solitude and naturalness if it were put to use. The impacts would be greater than in Alternative B, but less than all other alternatives, including Alternative A.

The creation of a forage reserve on the Lees Ferry Allotment in Vermilion would have a negligible impact on solitude and naturalness if it were put to use. Very few hikers are in Paria Canyon from November 15 to March 1, during the period when the allotment would be available for grazing. The impacts would be minor and positive.

In the Arizona Strip FO, impacts would be the same as described under Alternative A in the Cedar Wash Allotment, while impacts would be the same as described under Alternative B for grazing in the Highway and Littlefield Community allotments

Impacts from Recreation

Impacts from decisions relating to geocaching, inventory and monitoring, visitor use reporting, and outfitters and guides would be the same as described under Alternative B. Impacts from decisions relating to recreation marketing actions and signing and facilities would be the same as described under Alternative A.

Visitor Use, Carrying Capacity, and LAC: Using an LAC framework in intensive use areas would have a positive impact on designated wilderness. The establishment of acceptable resource, social, and managerial settings would provide an optimal balance between the demand for wilderness use and protection of wilderness values. These impacts would be indirect and long term.

Recreation Stock Use: Impacts would be the same as described under Alternative A.

Impacts from Interpretation and Environmental Education

Impacts would be the same as described under Alternative B.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative B.

Alternative D

Impacts from Travel Management

Under Alternative D, 148 miles of routes in Parashant and 93 miles in Vermilion would be closed to motorized and mechanized use by the public. A total of 86 miles of routes in Parashant and 51 miles in Vermilion would be limited to administrative use within the Monuments. Of these routes, 222 miles in Parashant and 16 in Vermilion lead directly to, run parallel to, or are within designated wilderness or NPS proposed wilderness. Solitude and naturalness would be slightly enhanced due to the closures in proximity to wilderness compared to Alternative A, although to a considerably lesser degree than under Alternative B, and slightly less than under Alternative C. As under Alternative C, these route closures would be effective in the both short- and long-term because routes would be rehabilitated using both natural and mechanical methods.

In the Arizona Strip FO, the current route system would be maintained until routes on Arizona Strip FO lands are officially designated. Currently, there are 4,934 miles of routes within the Arizona Strip FO that are open to motorized use. Until such designation occurs, impacts would be the same as described under Alternative A. It is expected that when route evaluation and designation occurs for the Arizona Strip FO lands, the public process will consider a range of alternatives, each having its own emphasis. One alternative could be similar to that of Alternative D in this Plan, which places an emphasis on maximum appropriate human use/influence and the widest array of visitor experiences and opportunities. It includes the most miles of open roads and trails (with the exception of Alternative A), and focuses on “hands-on” techniques for ecosystem restoration, resource management, and scientific research. As such, it offers fewer remote settings and the most motorized and structured recreation opportunities compared to the other alternatives.

Impacts from Wilderness Characteristics

Alternative D would maintain 140,949 acres of wilderness characteristics. In Parashant, the overall acreage where wilderness characteristics would be maintained would be approximately 65 percent less than Alternative B and 37 percent less than Alternative C. The areas adjacent existing wilderness areas would be less, but would still produce minor to moderate effects as described in Alternative B.

As under Alternative A, no areas in Vermilion would be managed to maintain wilderness characteristics. In the Arizona Strip FO, impacts would be the same as described under Alternative B. While the overall acreage of areas identified with wilderness characteristics

would increase/decrease by alternative, the areas adjacent to Kanab Creek Wilderness and Paiute Wilderness would remain unchanged.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative A.

Impacts from Fish and Wildlife

Impacts from wildlife transplants and wildlife drinkers/developments would be the same as described under Alternative A. Impacts from vegetation treatment projects would be the same as described under Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Visual Resources

Impacts would be the same as described under Alternative A for Vermilion, and the same as described under Alternative C for Parashant and the Arizona Strip FO.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B.

Impacts from Special Designations (Wilderness and Wild and Scenic Rivers)

Impacts would be the same as described under Alternative B.

Impacts from Livestock Grazing

Overall impacts from livestock grazing would be the same as under Alternative A. Impacts relating to the Tuweep and Pakoon allotments in Parashant would be similar to that described under Alternative C, except that the season of use in the Pakoon Allotment would increase by one month, to May 15, which is well into the visitor use season. Ephemeral extensions could further extend the growing season into June 1, resulting in impacts similar to those described under Alternative A when such extensions are applied. Impacts would be minor.

In Vermilion the creation of a forage reserve on the Lees Ferry Allotment could have a minor impact on solitude and naturalness if it were put to use. The River Pasture would be available for grazing November 1 to April 15 no more than three out of five years. A significant number of hikers are in Paria Canyon from mid-March through mid-November. Public perception of

wilderness character would be affected by the presence of livestock. The impacts under this alternative would be greater than all other alternatives.

In the Arizona Strip FO, the season of use proposed for grazing under Alternative D (October 15 to May 15) in the Cedar Wash, Highway, and Littlefield Community allotments would be the longest period of use among the alternatives. As a result, impact on wilderness character in the wilderness areas associated with those allotments would be the greatest under Alternative D compared to the other allotments.

Impacts from Recreation

Impacts from recreation marketing actions, signing and facilities, and SRP administration would be the same as described under Alternative A. Impacts from inventory and monitoring and visitor use reporting would be the same as described under Alternative B.

Geocaching: Working with local geocachers to relocate geocache sites if impacts to Monument objects or designated and proposed wilderness were apparent would have a positive impact. This action could also benefit the BLM and NPS by developing a solid working relationship with an active geocaching community.

Visitor Use, Carrying Capacity, and LAC: Mitigation of resource and social impacts on a case-by-case basis would have limited negative impacts to designated wilderness in the short term. In the long term, those impacts would be magnified; dealing with each impact as a single, unique problem rather than analyzing them holistically would negate the opportunity to solve problems before they become unmanageable.

Outfitters and Guides: Providing Outfitters and Guides with ethics publications and materials may have a positive effect on designated wilderness.

Recreational Stock Use: Prohibiting the use of horses in Paria Canyon above Bush Head Canyon and below Big Spring could have a positive effect on solitude, naturalness, and primitive/unconfined recreation in the area of the canyon that remained undisturbed. Soil disturbance, vegetation degradation, and hiker conflicts would be eliminated in this area. In those areas of the canyon where horses and pack stock were allowed, soil disturbance, vegetation degradation, and hiker conflicts would be a constant concern.

Impacts from Interpretation and Environmental Education

Impacts would be the same as described under Alternative B.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative B.

Alternative E: Proposed Plan

Impacts from Travel Management

Under Alternative E, 188 miles of routes in Parashant and 113 miles in Vermilion would be closed to motorized and mechanized travel by the public. A total of 167 miles in Parashant and 67 miles in Vermilion would be limited to administrative use within the Monument. Of these routes, 279 miles in Parashant and 35 miles in Vermilion lead directly to, run parallel to, or are within designated or proposed wilderness. Solitude and naturalness would be enhanced due to the closures in proximity to wilderness, resulting in impacts almost identical to Alternative C due to similar miles of closures. As under Alternatives C and D, these route closures would be effective in the both the short- and long-term because routes would be rehabilitated using both natural and mechanical methods.

The current route system would be maintained until routes on Arizona Strip FO lands are officially designated. Currently, there are 4,934 miles of routes within the Arizona Strip FO that are open to motorized use. Until such designation occurs, impacts would be the same as Alternative A. It is expected that when route evaluation and designation occurs for the Arizona Strip FO lands, the public process will consider a range of alternatives, each having its own emphasis. One alternative could be similar to that of Alternative E in this Plan, which emphasizes minimal human influence and use in the more remote sections of the Planning Area and more human use/influence in the areas adjacent to local communities or in areas presently receiving such use/influence. It attempts to balance human use/influence with resource protection. Where appropriate, it proposes a combination of management actions including allowing natural processes to continue, applying more hands-on treatment methods, and protecting the remote settings that currently exist in the Planning Area.

Impacts from Wilderness Characteristics

Alternative E would maintain 215,345 acres of wilderness characteristics. In Parashant, impacts would be the same as described under Alternative C due to the similar number of acres where wilderness characteristics would be maintained.

Under this alternative in Vermilion, areas managed to maintain wilderness characteristics would have a minor positive impact on the Paria Canyon-Vermilion Cliffs Wilderness. These impacts would be much less than Alternatives B or C and would be long-term and indirect. On the Paria Plateau, areas where wilderness characteristics would be maintained are adjacent to several portions of the Paria Canyon-Vermilion Cliffs Wilderness. Along 9 miles of the wilderness boundary on the plateau, the “wilderness core” would remain more distant from the nearest designated roads, as no new permanent roads would be authorized in areas where wilderness characteristics would be maintained. In the Ferry Swale area, one mile of wilderness boundary would be affected in the manner described.

In the Arizona Strip FO, impacts would be the same as Alternative B. While the overall acreage of areas managed to maintain wilderness characteristics would increase/decrease by alternative, the areas adjacent to Kanab Creek Wilderness and Paiute Wilderness remain unchanged.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative A

Impacts from Fish and Wildlife

Impacts from wildlife transplants and wildlife drinkers/developments would be the same as Alternative A. Impacts from vegetation treatment projects would be the same as Alternative B.

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Visual Resources

Impacts would be the same as described under Alternative C for Parashant. Impacts would be the same as described under Alternative A for Vermilion. Impacts would be the same as described under Alternative B for the Arizona Strip FO.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B.

Impacts from Special Designations (Wilderness and Wild and Scenic Rivers)

Impacts would be the same as described under Alternative B.

Impacts from Livestock Grazing

Overall impacts from livestock grazing would be the same as under Alternative A. Impacts relating to the season of use within Pakoon Springs and Tuweep Allotments in Parashant would be the same as described under Alternative C, with the exception that ephemeral extensions authorized in the Pakoon Springs Allotment would be the same as under Alternative D.

Impacts from grazing within the Lees Ferry Allotment in Vermilion would be the same as described under Alternative B, as would grazing in the Highway and Littlefield Community allotments in the Arizona Strip FO. Impacts from grazing in the Cedar Wash Allotment would be the same as described under Alternative D.

Impacts from Recreation

Impacts from recreation marketing actions, signing and facilities, and recreation stock use (Vermilion only) would be the same as described under Alternative A. Impacts from inventory and monitoring, visitor use reporting, and outfitters and guides would be the same as described under Alternative B. Impacts from using an LAC framework and decisions relating to SRP administration would be the same as described under Alternative C. Impacts from decisions relating to geocaching would be the same as described under Alternative D.

Impacts from Interpretation and Environmental Education

Impacts would be the same as described under Alternative B.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative B.

Cumulative Impacts

The geographic area of analysis for cumulative impacts to designated wilderness is the Planning Area, as well as the Utah portions of the Beaver Dam Mountains Wilderness and the Paria Canyon-Vermilion Cliffs Wilderness. Wilderness is primarily affected by the number and proximity of adjacent motorized travel corridors, the volume and type of traffic on those corridors, and the quantity and type of recreational users. To a lesser extent, range and wildlife management projects can impact wilderness. These impacts normally come from vegetation treatments and the installation, maintenance, and use of range/wildlife catchments and wildlife drinkers. Population growth and the resulting increase in recreational use are expected to have a significant impact to all wilderness areas on the Arizona Strip over the life of the plan. An increase in motorized and non-motorized use during the life of this Plan could have major impacts on the three components of wilderness character: solitude, naturalness, and opportunities for primitive/unconfined recreation.

CONGRESSIONAL DESIGNATIONS: WILD AND SCENIC RIVERS

Specific portions of the Paria River in Vermilion and the Virgin River in the Arizona Strip FO were identified in the Arizona Strip District RMP (BLM 1991) as eligible for further study in the wild and scenic river evaluation process. No rivers were identified as eligible in Parashant. The Arizona Statewide Wild and Scenic Rivers Legislative EIS (BLM 1994) later found these river segments suitable for inclusion in the National Wild and Scenic Rivers System. This section identifies potential impacts to those suitable river segments resulting from the proposed management actions.

Methods and Assumptions

The Arizona Statewide Wild and Scenic Rivers Legislative EIS (BLM 1994) identified certain interim management prescriptions that include management objectives, management actions, and appropriate allocations of land and resource uses to maintain or enhance the outstandingly remarkable values and tentative classification of the suitable segments of the Paria and Virgin rivers that flow through the Planning Area. Pursuant to the Wild and Scenic Rivers Act of 1968, no uses would be authorized reducing or destroying their potential eligibility classification or suitability for consideration for inclusion in the National Wild and Scenic Rivers System until Congress makes final decisions. Impacts on wild and scenic river values would come from management actions that either diminish or enhance the outstandingly remarkable or free flowing values that make the river eligible.

Negligible: A change enhancing or diminishing outstandingly remarkable or free flowing values could occur, but the change would be so small that it would not be of any measurable or perceptible consequence.

Minor: A change enhancing or diminishing outstandingly remarkable or free flowing values would occur, but the change would be small and, if measurable, would be localized and not affect eligibility or suitability determinations.

Moderate: A change enhancing or diminishing outstandingly remarkable or free flowing values would occur. The change would be measurable, but localized, with adverse impacts readily mitigated so not to threaten eligibility or suitability determinations.

Major: A change enhancing or diminishing outstandingly remarkable or free flowing values would occur. The change would be measurable and widespread, with adverse impacts potentially threatening eligibility or suitability determinations.

Impacts to Wild and Scenic Rivers

Impacts to the suitable segments of the Paria and Virgin rivers would result from actions proposed under the following resource management programs:

- Cultural Resources (Vermilion and only)
- Special Status Species (Arizona Strip FO only)
- Recreation (Arizona Strip FO only)
- Special Management Areas (Wild and Scenic Rivers: Vermilion and Arizona Strip FO)
- Livestock Grazing (Vermilion only)
- Lands and Realty (Arizona Strip FO only)

Alternative A: No Action

Impacts from Special Status Species

The Virgin River ACEC would be maintained at its current acreage under Alternative A. The entire wild and scenic river study area (a roughly ½ mile-wide corridor along the suitable river segment, extending ¼ mile from each side of the normal high water line) is located within the Virgin River ACEC. This ACEC designation partially functions to protect fish and wildlife habitat, aquatic and riparian resources, and other outstandingly remarkable values that contribute to the river's eligibility/suitability. Construction of a non-native fish barrier dam could reduce or degrade wild and scenic river eligibility/suitability on the Virgin River. Direct impacts would include introduction of a physical structure that would impede flows, increase siltation, and likely change vegetative characteristics. Impacts would be moderate and long term.

Impacts from Cultural Resources

Cultural resources are considered outstandingly remarkable values that make the Paria River eligible for wild and scenic river consideration. Under Alternative A, the Paria River would be a priority geographic and historic area for new field inventory, which would lead to identification of significant cultural sites. Following identification, the policy to conserve, protect, stabilize or restore, and maintain such resources in good or better condition would aid in the preservation of such resources and maintain the Paria River's eligibility and suitability classification.

Impacts from Special Management Areas (Wild and Scenic Rivers)

All of the wild and scenic rivers management actions proposed are based on interim management decisions outlined the Arizona Statewide Wild and Scenic Rivers Legislative EIS (BLM 1994). These decisions would maintain or enhance the outstandingly remarkable values and tentative classification of the suitable segments of the Paria and Virgin rivers.

Impacts from Recreation

Recreation experiences, including the feeling of solitude and remoteness within a pristine wilderness environment, were identified as an outstandingly remarkable value of the Paria River. Continuing current group size restrictions, visitor use limits, special area permits, and use fees in Paria Canyon would maintain such recreational experiences within the proposed wild and scenic river corridor.

Impacts from Livestock Grazing

Visitors in the Paria River corridor have complained about the presence of livestock, livestock droppings, flies, odors, and overgrazed vegetation in the lower portion of the corridor (BLM 1994). Grazing would continue to be authorized in the Lees Ferry Allotment under the current rest-rotation cycle under Alternative A. As a result, the visitor complaints would continue. Impacts to the outstandingly remarkable recreational values would be negligible since such values were identified under the current grazing system.

Impacts from Lands and Realty

The Virgin River Gorge 23,186 acre recreation (scenic) withdrawal would continue under Alternative A, which would help ensure maintenance of the scenic quality of the Virgin River corridor, an outstandingly remarkable value.

Acquisition of non-federal lands in Virgin River riparian areas would be negotiated as opportunities arise. Acquiring such lands would further ensure protection of outstandingly remarkable and free flowing values of the currently suitable segments that flow through BLM lands.

Alternative B

Impacts from Special Status Species

The Virgin River ACEC would be modified to include only the 100-year floodplain (approximately 2,063 acres). Boundary adjustments would exclude areas outside of the 100-year floodplain previously included in the ACEC. Some of these areas are still within the wild and scenic river study corridor. Areas outside the 100-year floodplain and not within the Paiute and Beaver Dam Mountains Wildernesses could experience some adverse impact due to mining activities (the wildernesses have been withdrawn from mining). Mining outside the wildernesses but within the Virgin River ACEC would require an approved plan of operation for locatable mineral activity. Such a plan would contain mitigation to minimize impacts to fish and wildlife, aquatic and riparian, geologic, and scenic values. The smaller ACEC would continue to protect fish and wildlife and aquatic and riparian values of the Virgin River. However, geologic and scenic values outside the smaller ACEC and the Paiute and Beaver Dam Mountains Wildernesses but within the wild and scenic river study corridor could be impacted by mining activities. Impacts would be minor.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Special Designations (Wild and Scenic Rivers)

Impacts would be the same as described under Alternative A.

Impacts from Recreation

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

The River Pasture of the Lees Ferry Allotment would be unavailable for grazing under Alternative B. This would improve visitor experiences along the Paria River, especially within lower portions. As a result, the outstandingly remarkable recreational values would be enhanced. Impacts would be minor.

Impacts from Lands and Realty

Revoking part of the Virgin River Gorge Recreation Lands Withdrawal that overlaps statutory wilderness would not affect protection of outstandingly remarkable values. Only the portions of the river tentatively classified as wild would be involved (i.e., those portions that flow through wilderness areas), which are sufficiently protected by wilderness management stipulations, including a VRM Class 1 designation. Impacts from land acquisitions would be the same as described under Alternative A.

Alternative C

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Special Management Areas (Wild and Scenic Rivers)

Impacts would be the same as described under Alternative A.

Impacts from Recreation

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

Grazing would continue in the Lees Ferry Allotment under a more restrictive rest-rotation cycle compared to Alternative A, which includes a slightly shorter season of use. As a result, the visitor complaints would continue, with the potential to decrease slightly. Impacts to the outstandingly remarkable recreational values would be negligible.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative B.

Alternative D

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Wild and Scenic Rivers

Impacts would be the same as described under Alternative A.

Impacts from Recreation

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

Grazing would continue in the Lees Ferry Allotment under a more lenient rest-rotation cycle compared to Alternative A, which includes a slightly longer season of use. As a result, the visitor complaints would continue, with the potential to increase slightly. Impacts to the outstandingly remarkable recreational values would be negligible,

Impacts from Lands and Realty

Impacts would be the same as described under Alternative B.

Alternative E: Proposed Plan

Impacts from Special Status Species

Impacts would be the same as described under Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative A.

Impacts from Special Management Areas (Wild and Scenic Rivers)

Impacts would be the same as described under Alternative A.

Impacts from Recreation

Impacts would be the same as described under Alternative A.

Impacts from Livestock Grazing

Impacts would be the same as described under Alternative B.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative B.

Cumulative Impacts

The geographic area of analysis for cumulative impacts to the suitable segments of the Paria and Virgin rivers includes the segments themselves and lands in the immediate vicinity of the segments. River segments recommended as suitable for Wild and Scenic River designation are currently under interim management until Congress acts to designate or release interim management. During this interim period, potential impacts to river segments emanate primarily from actions that could either diminish or enhance the outstandingly remarkable or free flowing values that make the river eligible. Proposed allocation and management of ACECs and management of existing designated wilderness generally would complement interim management of the river segments. However, potential construction of non-native fish barrier dams in the Virgin River and, to a lesser extent, livestock grazing in the river corridors could impact free flowing nature and certain outstandingly remarkable values respectively. Population growth and the resulting increase in recreational use in the vicinity of the Virgin River are expected to have greater potential for impacts to outstandingly remarkable values over the life of the Plan.

CONGRESSIONAL DESIGNATIONS: NATIONAL HISTORIC TRAILS

In 2002, Congress designated the Old Spanish Trail as a NHT. The trail qualifies for listing on the NRHP. Impacts to the Old Spanish NHT would result from destruction or alteration of the trail corridor or associated resources and from alterations of the trail's historic setting. Impacts could include unauthorized collection and excavation, vandalism, erosion, OHV use off-road, and mechanized surface disturbance.

Methods and Assumptions

The trail primarily crosses the Arizona Strip FO, particularly in the northwestern corner of the Planning Area near Littlefield, Arizona. A portion of the southern branch may cross through Vermilion. The trail does not cross through Parashant.

In evaluating the impacts associated with meeting the goals of the National Trails System and the potential NRHP listing, best professional judgment was used. Impacts would be considered major if they resulted in an intact trail segment or associated resource losing the integrity it now possesses for inclusion in the NRHP.

Impacts to the NHT in the Planning Area would result from actions proposed under the following resource management programs:

- Visual Resources
- Cultural Resources
- Recreation
- Special Designations (Arizona Strip FO only)
- Lands and Realty (Arizona Strip FO only)

Alternative A: No Action

<u>Impacts from Visual Resources</u>

Under the No Action Alternative, the major portions of the Old Spanish NHT that cross the northwestern corner of the Arizona Strip FO would be designated VRM Class III (the trail segment crossing the extreme corner of the state) and VRM Class II (the branch of the trail that leads to Beaver Dam and follows the Virgin River). Some protection of the visual setting of the trail would be preserved in the VRM Class II area while some visual intrusions may be allowed in the VRM Class III area, which could alter the historic setting of the trail. Impacts could be minor, with some site-specific moderate impacts.

In Vermilion, all NHT trail segments would be designated VRM Class II, providing protection from visual alteration of the historic setting.

Impacts from Cultural Resources

There would be no impacts from the cultural resources program under Alternative A.

Impacts from Recreation

Impacts to the Old Spanish NHT could occur wherever OHV routes cross any remaining, intact trail segments, associated resources, and the historic setting in which they occur. These OHV routes could lead to subsequent erosion that could alter the resource or its setting. Though intact, Old Spanish NHT segments in the Planning Area are difficult to find and, consequently, have not been precisely recorded and documented. Impacts could range from minor to moderate.

Impacts from Special Designations (Arizona Strip FO only)

Portions of the Old Spanish NHT cross through the Beaver Dam Slope and Virgin River ACECs, which would benefit from the protection offered to special status species and cultural resources. Impacts would be minor.

Impacts from Lands and Realty (Arizona Strip FO only)

The regional utility corridor parallels a major segment of the Old Spanish NHT in the northwestern corner of the Arizona Strip FO and crosses it in several places. Use of the existing utility corridor and subsequent powerline additions would continue to impact the NHT through destruction of the trail segments and associated resources, as well as compromising the historic setting. Impacts would be moderate.

Alternative B

Impacts from Visual Resources

Under Alternative B, most of the Old Spanish NHT within the Planning Area would be protected under VRM Class II, except for the main trail segment in the northwest corner of the Arizona Strip FO that follows the regional utility corridor, which would be designated VRM IV. Impacts along the VRM IV sections would range from moderate to major. Impacts along the remaining sections of the NHT in the Planning Area would be minor.

Impacts from Cultural Resources

Under Alternative B, the Old Spanish NHT would be designated a Public Use Site. This could result in increased visitation, which could impact the trail, associated resources, and historic setting from additional vehicle traffic, increased erosion and vandalism, and loss of site integrity. Overall impacts would be minor, although some site-specific impacts could be moderate.

Interpretation and public education about the NHT would help the public appreciate and protect this resource.

Impacts from Recreation

Impacts would be the same as described under Alternative A.

Impacts from Special Designations (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Alternative C

Impacts from Visual Resources

Under Alternative C, more of Old Spanish NHT in the northwestern corner of the Arizona Strip FO would be assigned to Class III and IV, which would allow for more modification of the natural landscape and potential loss of the integrity of the NHT, resulting in moderate to major impacts. Impacts would be minor along the remaining sections of the NHT.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B.

Impacts from Recreation

Impacts would be the same as described under Alternative A.

Impacts from Special Designations (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Alternative D

Impacts from Visual Resources

Impacts would be the same as described under Alternative C.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B.

Impacts from Recreation

Impacts would be the same as described under Alternative A.

Impacts from Special Designations (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Alternative E, Proposed Plan

Impacts from Visual Resources

Impacts would be the same as described under Alternative B.

Impacts from Cultural Resources

Impacts would be the same as described under Alternative B.

Impacts from Recreation

Impacts would be the same as described under Alternative A.

Impacts from Special Designations (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Impacts from Lands and Realty (Arizona Strip FO only)

Impacts would be the same as described under Alternative A.

Cumulative Impacts

The geographic area of analysis for cumulative impacts to the Old Spanish NHT is the Planning Area and surrounding communities. The NHT is primarily affected by the OHV use and the existing ROW corridor. To a lesser extent, visitation and vandalism of the NHT would also affect its integrity. Population growth and the resulting increase in recreational use are expected to have a significant impact on the NHT and its historic setting. Additional population, particularly in the Mesquite and Lincoln County area in Nevada, would result in more recreational use of the NHT, which would increase OHV traffic along the trail corridor, the potential for vandalism, and demands for use of the ROW corridor over the life of the Plan.

ADMINISTRATIVE DESIGNATIONS: AREAS OF CRITICAL ENVIRONMENTAL CONCERN

The primary issue associated with ACECs involves the number and size of ACECs proposed under each of the Alternatives.

Methods and Assumptions

This section identified changes in number and size of ACECs within the Planning Area. Specific impacts to various resources from the designation of ACECs are discussed under the specific resource management programs. Only impacts to ACECs in Parashant and Arizona Strip FO are addressed since no ACECs currently exist in Vermilion and none are proposed under any of the alternatives.

Impacts to ACECs

Impacts to ACECs would result from actions proposed under the following resource management programs:

- Special Status Species
- Cultural Resources

Alternative A: No Action

<u>Impacts from Special Status Species</u>

Impacts from implementing Alternative A would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative A to special status species in ACECs designated for protecting special status species are described under Alternative A in the Impacts to Special Status Species section.

In Parashant under Alternative A, designation of the Pakoon ACEC would continue at 76,014 acres for protection of the threatened desert tortoise and Mojave Desert Ecological Zone values.

In the Arizona Strip FO under Alternative A, the eight ACECs designated to protect special status species would continue at their current acreage. These include the Beaver Dam Slope (51,196 acres), Fort Pearce (916 acres), Johnson Springs (2,464 acres), Lost Spring Mountain (8,262 acres), Marble Canyon (11,012 acres), Moonshine Ridge (5,095), Virgin River Corridor (8,075 acres), and Virgin Slope (39,931 acres) ACECs for a total of 126,951 acres.

Impacts from Cultural Resources

Impacts from implementing Alternative A would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative A to cultural resources in ACECs designated for protecting cultural values are described under Alternative A in the Impacts to Cultural Resources section.

In Parashant, the two ACECs designated to protect cultural resources would continue at their current acreage. These include the Witch Pool ACEC at 279 acres and the Nampaweap ACEC at 535 acres, for a total of 814 acres.

In the Arizona Strip FO, the four ACECs designated to protect cultural resources would continue at their current acreage. These include Little Black Mountain (241 acres), Johnson Springs (2,464 acres), Lost Spring Mountain (8,262 acres), and Moonshine Ridge (5,095 acres) ACECs, for a total of 16,062 acres.

Alternative B

Impacts from Special Status Species

Impacts from implementing Alternative B would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative B to special status species in ACECs designated for protecting special status species are described under Alternative B in the Impacts to Special Status Species section.

In Parashant, the Pakoon ACEC designation would not continue under Alternatives B because the Monument designation provides protection to threatened desert tortoises for which the ACEC was established.

In the Arizona Strip FO under Alternative B, six of the existing ACECs would increase in size, with Marble Canyon ACEC experiencing the greatest increase (over nine times its current size); Johnson Spring ACEC would decrease by 406 acres; and Virgin River Corridor ACEC would be roughly a quarter in size. When combined, the eight existing special status species ACECs

would equal 221,944 acres, a gain of 111,729 acres compared to Alternative A. Impacts to ACECs would be major.

Also under Alternative B in the Arizona Strip FO, eleven new ACECs would be designated, including Black Knolls, Buckskin, Clayhole, Coyote Valley, Gray Points, Hurricane Cliffs, Kanab Creek, Lime Kiln/Hatchet Canyon, Lone Butte, Shinarump, and Twist Hills ACECs, for a total of 76,374 acres. When combined, the number of acres falling within ACEC designation under Alternative B would be more than double that proposed under Alternative A (308,390 acres compared to 127,192 acres). Impacts to ACECs would be major.

Impacts from Cultural Resources

Impacts from implementing Alternative B would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative B to cultural resources in ACECs designated for protecting cultural values are described under Alternative B in the Impacts to Cultural Resources section.

In Parashant, the Witch Pool and Nampaweap ACEC designations would not continue under Alternative B because the Monument designation provides protection of cultural resources for which the ACECs were established.

In the Arizona Strip FO under Alternative B, Lost Spring Mountain and Moonshine Ridge ACECs would increase in size, Little Black Mountain ACEC would remain the same, and Johnson Spring ACEC would decrease by 406 acres. When combined, the four existing cultural ACECs would equal 29,274 acres, an increase of 13,212 acres compared to Alternative A.

Also under Alternative B in the Arizona Strip FO, four new ACECs would be designated for the protection of cultural resources; these include Marble Canyon, Kanab Creek, Shinarump, and Lone Butte ACECs. While Marble Canyon ACEC is an existing ACEC designated to protect an endangered cactus that would be continued under Alternative A, it would be expanded in both scope (to include cultural resources) and size (over nine times the current number of acres) under Alternative B. When combined, the number of acres designated as ACECs for the protection of cultural resources under Alternative B would be more than five times that proposed under Alternative A (150,080 acres compared to 27,074 acres). Impacts to ACECs would be major.

Alternative C

Impacts from Special Status Species

Impacts from implementing Alternative C would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative C to special status species in ACECs designated for protecting special status species are described under Alternative C in the Impacts to Special Status Species section.

In Parashant, impacts would be the same as described under Alternative B. Under Alternative C in the Arizona Strip FO, four of the existing ACECs would increase in size while four would decrease in size. When combined, the eight existing special status species ACECs would equal 120,669 acres, a loss of 6,282 acres compared to Alternative A. Impacts to ACECs would be moderate. Three additional ACECs, Kanab Creek, Lone Butte, and Black Knolls, would be created, adding 11,191 acres for a total of 131,860 special status species acres under Alternative C, 4,908 more acres than under Alternative A. Impacts would be moderate.

Impacts from Cultural Resources

Impacts from implementing Alternative C would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative C to cultural resources in ACECs designated for protecting cultural values are described under Alternative C in the Impacts to Cultural Resources section.

In Parashant, impacts would be the same as described under Alternative B. Under Alternative C in the Arizona Strip FO, Johnson Springs, Lost Spring Mountain, and Moonshine Ridge ACECs would decrease in size, while Little Black Mountain ACEC would remain the same size. When combined, the four existing cultural ACECs would equal 9,233 acres, a decrease of 6,828 acres compared to Alternative A.

Also under Alternative C in the Arizona Strip FO, Marble Canyon, Kanab Creek, and Lone Butte ACECs would be designated for the protection of cultural resources for a total of 23,037 acres. The total the number of acres designated as ACECs for the protection of cultural resources under Alternative C would be over two times of that proposed under Alternative A (32,270 acres compared to 16,062 acres). Impacts would be major, but not as intense as under Alternative B.

Alternative D

Impacts from Special Status Species

Impacts from implementing Alternative D would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative D to special status species in ACECs designated for protecting special status species are described under Alternative D in the Impacts to Special Status Species section.

In Parashant, impacts would be the same as described under Alternative B. Under Alternative D in the Arizona Strip FO, only four of the existing ACECs (Beaver Dam Slope, Marble Canyon, Virgin River Corridor, and Virgin Slope) would retain their designation. When combined, these would equal 106,179 acres, 20,772 less acres than under Alternative A. No new ACECs would be designated. Impacts would be moderate.

Impacts from Cultural Resources

Impacts from implementing Alternative D would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative D to cultural resources in ACECs designated for protecting cultural values are described under Alternative D in the Impacts to Cultural Resources section.

In Parashant, impacts would be the same as described under Alternative B. Under Alternative D in the Arizona Strip FO, Little Black Mountain is the only preexisting ACEC designated to protect cultural resources that would be continued. Marble Canyon ACEC would be expanded to include protection of cultural resource values. Marble Canyon and Little Black Mountain ACEC, when combined, would comprise 12,166 acres, which is the fewest ACEC acres designated to protect cultural resources among the alternatives and 3,896 less acres compared to Alternative A. Impacts would be moderate.

Alternative E: Proposed Plan

Impacts from Special Status Species

Impacts from implementing Alternative E would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative E to special status species in ACECs designated for protecting special status species are described under Alternative E in the Impacts to Special Status Species section.

In Parashant, impacts would be the same as described under Alternative B. Under Alternative E in the Arizona Strip FO, six of the existing ACECs would increase in size, while two would decrease. When combined, the eight existing special status species ACECs would equal 138,636 acres, a gain of 11,684 acres compared to Alternative A.

Also under Alternative E in the Arizona Strip FO, four new ACECs would be designated, including Black Knolls, Kanab Creek, Lone Butte, and Shinarump, for a total of 18,575 acres. When combined with the existing ACECs, there would be 30,260 more acres designated as ACECs under Alternative E compared to Alternative A.

Impacts from Cultural Resources

Impacts from implementing Alternative E would vary depending upon the management action and the specific ACEC. Impacts from management actions proposed under Alternative E to cultural resources in ACECs designated for protecting cultural values are described under Alternative E in the Impacts to Cultural Resources section.

In Parashant, impacts would be the same as described under Alternative B. Under Alternative E in the Arizona Strip FO, Little Black Mountain and Kanab Creek ACECs would remain the

same. When combined, the two existing cultural ACECs would equal 13,389 acres, an increase of 2,673 acres compared to Alternative A, which is the same as under Alternative B.

There are four new ACEC designations proposed under Alternative B in the Arizona Strip FO that would also occur under Alternative E these include Johnson Spring, Lost Spring Mountain, Marble Canyon and Moonshine Ridge. Acreages would all increase in size with the exception of Marble Canyon ACEC, which would be 11,797 acres (90,617 less acres than under Alternative B). When combined, the number of acres designated as ACECs for the protection of cultural resources under Alternative E would be 57,188 acres over three and a half times that proposed under Alternative A.

ADMINISTRATIVE DESIGNATIONS: RESOURCE CONSERVATION AREAS

The primary issue associated with RCAs involves the number and size of RCAs proposed under each of the Alternatives.

Methods and Assumptions

This section identifies changes in number and size of RCAs within the Planning Area. There are currently three RCAs within the Planning Area, two in Parashant and one in Vermilion. These RCAs would continue under Alternative A while they would be eliminated under all other Alternatives.

Impacts to RCAs

Impacts to RCAs would result from actions proposed under the following resource management programs:

Special Designations (RCAs)

Alternative A: No Action

<u>Special Designations</u>

In Parashant under Alternative A, recognition of the Parashant Area RCA would continue at 39,854 acres and recognition of the Mt. Trumbull Area RCA would continue at 102,305 acres. In Vermilion, recognition of the Canyons and Plateaus of the Paria RCA would continue at 317,172 acres.

Alternatives B, C, D, and E (Proposed Plan)

Special Designations

In Parashant, recognition of the Parashant Area and Mt. Trumbull Area RCAs would not continue under Alternatives B, C, D, or E because the Monument designation provides protection of the unique resources for which the RCAs were established. In Vermilion, recognition of the Canyons and Plateaus of the Paria RCA would not continue under Alternatives B, C, D, or E because the Monument designation provides protection of the unique resources for which the RCA was established.

IMPACT TO SOCIAL AND ECONOMIC CONDITIONS

SOCIOECONOMICS

As described in Chapter 3 and detailed in Appendix 3.I, the socioeconomic study area expands over portions of three states and five counties that are sparsely populated but with exceptional growth rates. Management actions that influence employment, demands for goods and services, business growth, and visitation within this broad study area would affect socioeconomics. Impacts would most greatly be felt in small rural communities that economically and socially rely, at least partially, on resources uses within the Planning Area, including harvesting vegetation products, grazing livestock, extracting minerals, recreating, and traveling.

Decisions made in regards to the transportation system in the Planning Area could affect the study area's economy by expanding or limiting access to recreation, ranching, mining, or vegetative product-related activities. Designating certain areas as either open, limited to designated roads and trails or to existing roads and trails, or closed, would place new restrictions on OHV enthusiasts, which could impact revenues created directly or indirectly by this form of recreation (e.g., OHV and associated equipment and fuel sales, OHV repairs, dining, lodging, etc.). Increased or decreased non-motorized backcountry opportunities could also impact revenues created directly or indirectly for individuals seeking those types of recreation opportunities (e.g., backpacking supplies, horse boarding and supplies, dining, lodging, etc.).

Allowing or preventing the sale or free use of vegetative products (e.g., native seed, medicinals, propagation materials, florals/greens/craft markets, mosses, mushrooms, lichens, landscape mulch, poles, fuel wood, Christmas trees, lumber, pinyon nuts, etc.) would impact local businesses or individuals who rely on such use.

Hunting management and the number and types of habitat improvement projects aimed at improving health and vitality of game animals, specifically big game such as trophy mule deer, would affect local economies in terms of influencing the number and types of hunters coming to the Planning Area and the number and success of professional outfitters.

Actions that increase mining activities would tend to stimulate the local and regional economies, both through increased employment and demand for goods and services for the mining operation itself. Duration of this effect would depend upon the magnitude of mineral deposits and market demand for the products. Conversely, actions eliminating current mining activities or discouraging or precluding new mining activities would tend to decrease or at least limit local and regional economic benefits.

Any action that enhances the quality of recreation experience or creates additional facilities or improved access would potentially increase visitation demand. Increased visitation would stimulate increased expenditures for goods and services in the local and regional economies. This in turn would tend to encourage additional business activity and population growth.

Land disposals that ultimately lead to development for residential use or commercial and light industrial development, would have an economic impact in terms of employment and earnings, as well as increased tax base for the area.

Changes in allowable grazing could influence ranchers within the Planning Area and directly influence the economic viability and scale of existing ranching operations. Such actions, in turn, could affect local communities dependent upon ranching operations in terms of tax revenue from livestock sales, jobs, purchase of equipment and feed, etc.

Methods and Assumptions

The analysis of potential impacts to socioeconomics is based on the expertise of BLM resource specialists at the Arizona Strip FO, the NPS staff at Lake Mead NRA, and BLM staff in the BLM Washington Office. Combined, these staff members possess an extensive knowledge of socioeconomic-related issues within the Planning Area. In addition, concerns were gathered from communities through town-hall type meetings that are used in the analysis. The impact analysis is also based on review of existing literature and information provided by non-planning team experts in the BLM, NPS, and other agencies.

Negligible: Overall impacts on employment, demand for goods and services, and business growth within the study area would not be detectable. In general, businesses (including ranching operations) would not experience much growth or decline.

Minor: Overall impacts on employment, demand for goods and services, and business growth within the study area would not be detectable. Some small businesses (including ranching operations) would experience slight growth or decline, with a few jobs being lost or gained.

Moderate: Overall impacts on employment, demand for goods and services, and business growth within the study area would be slight. Impacts at the local level would be more apparent as several small to medium-sized businesses (including ranching

operations) would experience some growth or decline, with a several jobs being lost or gained, although not detectable in the communities employment rate.

Major: Overall impacts on employment, demand for goods and services, and business growth within the study area would be apparent. Impacts at the local level would be extensive, as numerous businesses (including ranching operations) would experience extended growth or decline, with some businesses closing new businesses being formed. The number of jobs being lost or gained would reflect in the particular communities' employment rate.

Economic impacts due to changes in livestock grazing patterns is evaluated by comparing the total number of active AUMs by alternative, which can be used to determine changes in direct impacts, economic activity, earned income, number of jobs, and indirect business taxes (see Table 4.3). The model used to determine these economic indicators comes from Fletcher et. al. (2006) and is based on a mid-range direct dollar per AUM of $38.90 (see Chapter 3, Table 3.38).

Impacts to Socioeconomics

Impacts to socioeconomics would result from actions proposed under the following resource management programs:

- Travel Management
- Vegetation
- Fish and Wildlife
- Minerals (Arizona Strip FO only)
- Livestock Grazing
- Recreation
- Lands and Realty

Alternative A: No Action

Impacts from Travel Management

Under Alternative A, no parts of the Monuments would be open to motorized and mechanized cross-country vehicle travel as motor vehicles would be limited to designated roads. Lands within BLM wilderness areas and NPS proposed wilderness areas would be closed to motorized and mechanized vehicle use. While this would restrict OHV use off designated roads and trails, OHV and other motorized vehicle users would have access to 1,715 miles of roads in Parashant and 446 miles of roads in Vermilion for purposes of exploring and recreating.

This recreation opportunity compounded by the projected increased population growth in the socioeconomic study area encompassing the Monuments would result in increased visitation,

Table 4.3: Economic Impacts due to AUM Change by Alternative

Types of Impacts	Alt. A	Alternative B			Alternative C			Alternative D			Alternative E		
	Active AUMs	AUM Reduced	% Change	Active AUMs	AUM Reduced	% Change	Active AUMs	AUM Reduced	% Change	Active AUMs	AUM Reduced	% Change	Active AUMs
AUM Numbers	183,000	9,165	5.0%	173,835	840	0.5%	182,160	382	0.2%	182,618	1,131	0.6%	181,869
Direct Impacts	$7,118,900	$356,518		$6,762,382	$32,676		$7,086,224	$14,860		$7,103,840	$43,996		$7,074,904
Total Economic Activity	$16,415,000	$822,100		$15,592,900	$75,348		$16,339,652	$34,265		$16,380,835	$101,451		$16,313,549
Total Earned Income	$2,917,020	$146,090		$2,770,930	$13,389		$2,903,631	$6,089		$2,910,931	$18,028		$2,905,448
Total # of Jobs	271.7	13.6		258.1	1.2		270.5	0.6		271.1	1.7		270.0
Indirect Business Taxes	$490,440	$24,562		$465,878	$2,251		$488,189	$1,024		$489,416	$3,031		$487,409
Parashant NM													
AUM Numbers	38,000	4,861	12.8%	33,139	840	2.2%	37,160	382	1.0%	37,618	840	2.2%	37,160
Direct Impacts	$1,478,200	$189,093		$1,289,107	$32,676		$1,445,524	$14,860		$1,463,340	$32,676		$1,445,524
Total Economic Activity	$3,408,600	$436,032		$2,972,568	$75,348		$3,333,252	$34,265		$3,374,335	$75,348		$3,333,252
Total Earned Income	$605,720	$77,484		$528,236	$13,389		$592,331	$6,089		$599,631	$13,389		$592,331
Total Number of Jobs	56.4	7.2		49.2	1.2		55.2	0.6		55.8	1.2		55.2
Indirect Business Taxes	$101,840	$13,027		$88,812	$2,251		$99,589	$1,024		$100,816	$2,251		$99,589
Vermilion Cliffs NM													
AUM Numbers	31,000	291	0.9%	30,719	0	0%	31,000	0	0%	31,000	291	0.9%	30,719
Direct Impacts	$1,205,900	$11,320		$1,194,580	No Change		$1,205,900	No Change		$1,205,900	$11,320		$1,194,580
Total Economic Activity	$2,780,700	$26,103		$2,754,597			$2,780,700			$2,780,700	$26,103		$2,754,597
Total Earned	$494,140	$4,639		$489,661			$494,140			$494,140	$4,639		$489,661

Table 4.3: Economic Impacts due to AUM Change by Alternative

Types of Impacts	Alt. A	Alternative B			Alternative C			Alternative D			Alternative E		
	Active AUMs	AUM Reduced	% Change	Active AUMs	AUM Reduced	% Change	Active AUMs	AUM Reduced	% Change	Active AUMs	AUM Reduced	% Change	Active AUMs
Income													
Total # of Jobs	46.0	0.4		45.6			46.0			46.0	0.4		45.6
Indirect Business Taxes	$83,080	$780		$82,300			$83,080			$83,080	$780		$82,300
Arizona Strip Field Office													
AUM Numbers	114,000	4,013		109,987			114,000			114,000			114,000
Direct Impacts	$4,434,600	$156,106		$4,278,494			$4,434,600			$4,434,600			$4,434,600
Total Economic Activity	$10,225,800	$359,966		$9,865,834	0		$10,225,800	0		$10,225,800	0		$10,225,800
Total Earned Income	$1,817,160	$63,967	3.5%	$1,731,193	No Change	0%	$1,817,160	No Change	0%	$1,817,160	No Change	0%	$1,817,160
Total # of Jobs	169.2	6.0		163.2			169.2			169.2			169.2
Indirect Business Taxes	$305,520	$10,755		$294,765			$305,520			$305,520			$305,520

Source: Fletcher et al 2006

which in turn, would have a minor to moderate impact on local economies. Those desiring non-motorized forms of recreation would also utilize the transportation system under Alternative A as a means to access more remote portions of the Monuments. Ranchers needing to access their operations could also use the open roads as well as administrative use roads, thus allowing for the continued economic contribution ranching has on the study area's economy.

In the Arizona Strip FO under Alternative A, 803 acres would be open to motorized and mechanized cross-country vehicle travel, which would provide a limited amount of recreational opportunities for OHV users and other off-road enthusiasts. Having an Motorized Speed Event area designated on 179,551 acres would also serve the needs of OHV enthusiasts. In addition, the public would have access to 52 miles of open roads in the Ferry Swale Sub-region, and 4,934 miles in the undesignated sub-regions of the Arizona Strip for purposes of exploring and recreation This recreation opportunity compounded by the projected increased population growth in the socioeconomic study area encompassing the Arizona Strip FO would result in increased visitation, which, in turn, would have a minor to moderate impact on local economies. Impacts would be greatest felt in the small communities the within the Arizona Strip FO boundaries, including Fredonia, Colorado City, and the Marble Canyon area. Those desiring non-motorized forms of recreation would also utilize the transportation system under Alternative A as a means to access more remote portions of the Arizona Strip FO. The open roads could also be used by ranchers needing to access their operations, thus allowing for the continued economic contribution ranching has on the study area's economy. Permittees would also have access via administrative use only roads.

Impacts from Vegetation and Fire and Fuels Management

On BLM lands throughout the Planning Area, commercial use of vegetation would be allowed in specified areas and managed under the multiple use/sustained yield concept. Parashant would be closed to the sale of vegetative products; however, the sale, collection, or use of vegetative material (e.g., native seed, medicinals, landscape mulch, posts, fuel wood, etc.) could be allowed in the Monument, by permit only, if associated with research or restoration project. Since the amount harvested would be minimal, economic impacts would be negligible. Vermilion would also be closed to the sale of vegetative products. Since the area contains limited vegetative resources of any economic value, impacts would be negligible. In the Arizona Strip FO, personal Christmas tree and post cutting would be allowed, providing a service to those communities within and adjacent to the Arizona Strip FO. Since overall use would be minimal, economic impacts would be negligible.

Impacts from Fish and Wildlife

Improving mule deer habitat where needed would help maintain trophy deer numbers. This, in turn, would continue to attract hunters to the BLM portion of the Monument and economically benefit businesses. Protecting and/or enhancing habitats of other forms of wildlife (e.g., bighorn sheep, pronghorn antelope, migratory birds, and Merriam's Turkey) would also provide wildlife-

viewing opportunities that would benefit local businesses catering to such users. In Parashant, continuing to manage the Mt. Trumbull Watchable Wildlife Area would also continue to attract visitors into the area.

Impacts from Minerals (Arizona Strip FO only)

Closing or withdrawing areas from mineral operations (i.e., fluid mineral leasing, mining, and mineral material disposals) would directly limit the amount of economic development based on mineral operations and sales, while designating areas open would support economic development. The primary current mineral operation in the Arizona Strip FO is gypsum mining near Black Rock Gulch, which contributes to the local economies, specifically adding jobs in the St. George area. Management actions related to locatable minerals under Alternative A (e.g., acres open to operation of the mining laws with or without restrictions or a mining plan and acres withdrawn to mining location)would allow continued mining of the rich gypsum deposits south of St. George and allow for expansion of such projects.

Impacts from Livestock Grazing

The greatest number of active AUMs would occur under Alternative A, which would result in the greatest economic contribution to the study area compared to the other alternatives. Under Alternative A, 183,000 active AUMs covering the three planning areas would result in nearly $16.5 million in total economic activity (direct expenders plus secondary economic contributions), generate nearly $3 million in personal income, support 272 jobs, and contribute over $490 thousand dollars to indirect business taxes (see Table 4.3).

In Vermilion under Alternative A, there would be 31,000 active AUMs contributing $2,780,700 in total economic activity, $494,140 in personal income, 46 jobs, and $83,080 in indirect business taxes. In Parashant, there would be 38,000 active AUMs contributing $3,408,600 in total economic activity, $605,720 in personal income, 56 jobs, and $101,840 in indirect business taxes. In the Arizona Strip FO, there would be 114,000 active AUMs contributing $10,225,800 in total economic activity, $1,817,160 in personal income, 169 jobs, and $305,520 in indirect business taxes (see Table 4.3).

Impacts from Recreation

Regardless of alternative, visitor use is expected to increase throughout the Planning Area, especially in the Monuments. This would partially be the result of the rapidly growing communities and counties in the study area, as well as new interest created for visiting the Planning Area since the Monuments were designated (i.e., as a result of a “designation effect”). One study showed that 87 percent of those surveyed who visited Parashant came from one of the three states in the study area (Northern Arizona University 2003), all of which showed phenomenal growth over the past few decades. Based solely on projected growth of the counties within the study area (with the exception of Lincoln County, Nevada, which would contribute

little in terms of overall visitation numbers), total visitation would increase by 31 percent between 2000 and 2010. This increased visitation would have economic impacts to communities in the study area that serve as stopping points for services near the Monuments. The small communities within and near the Planning Area's boundaries would feel the greatest impacts, including Mesquite and Bunkerville in Nevada and Fredonia; Colorado City, Page, the Virgin River Communities and the Marble Canyon Area in Arizona; and Kanab and Big Water, Utah.

Placing visitor limits and applying regulations or restrictions could limit visitation at some sites and reduce the economic benefit of visitation in the area. However, such practices would only occur when monitoring of resource and social conditions indicates a trend toward unacceptable change brought about by visitation. Impacts would thus be negligible. Visitation restrictions placed in listed species and other sensitive habitat and restrictions on recreational stock use could discourage some recreationists. Retaining restrictions and fees placed on recreation use in Paria Canyon, Buckskin Gulch, Wire Pass and Coyote Buttes (Vermilion) and continuing the current recreation use permits and use fees program required for use in the Virgin Gorge Recreation Area (Arizona Strip FO) would maintain the current amount of use, thus limiting the amount of economic contribution from recreation within these areas. Maintaining existing SRMA designations to ensure greater recreation emphasis and investment and providing some managing visitor facilities (e.g., interpretive, safety, and informative signs; kiosks; interpretive sites; etc.) would help improve visitor experiences and potentially encourage return trips. Allowing the Rhino Rally motorcycle race in the Arizona Strip FO would continue to provide economic benefits from rally participants and observers who patronize local businesses. Overall impacts from recreation management actions would be negligible compared to the expected trend of visitor growth with or without such actions.

Impacts from Lands and Realty

As mandated by the Monument proclamations, appropriating and withdrawing all federal lands and interests in lands from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws would allow no economic development or community growth within the Monuments. Processing no new ROWs and ancillary public facilities, with a few exceptions, would limit growth within the Monuments. While such impacts could affect communities adjacent to Vermilion in the Marble Canyon area as the area grows in the future, overall impacts would be negligible.

In the Arizona Strip FO, management actions aimed at reaching the goal of supporting community growth and expansion needs by making public lands available for recreation, public purposes, and other infrastructure needs would be beneficial for the study area's economy. This includes making up to 7,335 acres available for exchange, sale, or R&PP sale and an additional 17,853.47 acres available for exchanges only. These land disposals could lead to development for residential use or commercial and light industrial development, would have an economic impact in terms of employment and earnings, as well as increased tax base for the area. Impacts could range from minor to moderate in the communities directly affected.

Alternative B

Impacts from Travel Management

Impacts would be similar to that described under Alternative A due to no roads being open to motorized and mechanized cross-country vehicle travel. However, the public would have access to less than half the miles of roads for purposes of exploring and recreating by motorized and mechanized means compared to Alternative A, and special mitigating measures would be applied to most of these roads. This could limit the number of visitors seeking motorized forms of recreation and/or result in negative experiences due to traffic levels on roads that would remain open. It would also affect those individuals seeking areas to engage in non-motorized activities. While Alternative B would increase the miles of roads and trails for non-motorized forms of recreation, it would also make many areas inaccessible by limiting motorized access necessary to reach such areas. The impact to local businesses in communities near the Monuments that are compatible with motorized, and to a less extent non-motorized activities would range from minor to moderate, with the greatest effects being felt in the smaller communities more dependent upon recreation within the Monuments. While ranchers would also be impacted, they would be allowed access to their ranching operations by way of roads open to administrative use only, resulting in a negligible economic impact.

Under Alternative B, no part of the Arizona Strip FO would be open to motorized and mechanized cross-country vehicle travel, which would prohibit cross-country recreational opportunities for OHV users and other off-road, motorized enthusiasts. This would reduce the number of individuals coming into the area for such activities and thus directly reduce the amount of economic contribution such recreationists would make to the local economies. However, economic impacts would be negligible considering the relatively few acres open in Alternative A, which could only support a minimum number of OHV users. Within the Ferry Swale Sub-region, the public would have access to slightly more than half the miles of roads for recreating and exploring purposes compared to Alternative A, and special mitigating measures would be applied to virtually all miles of open routes. This would decrease the economic benefit stemming travel-related recreation within the Ferry Swale area. Similar impacts would occur in the Littlefield and St. George Basin sub-regions, while impacts in the undesignated Arizona Strip FO sub-regions would be the same as under Alternative A. Overall impacts would be minor. Ranchers and other permittees would be allowed access by means of roads open to administrative use only, reducing the intensity of impacts on such users.

The majority of the Monuments (86-87 percent) would be delineated under the Primitive TMA under Alternative B. This TMA emphasizes semi-primitive and non-motorized/primitive experiences, which entails more restrictions on motorized forms of travel, especially for recreation purposes. This would reduce opportunities for motorized forms of recreation, affecting those businesses surrounding the Monuments that are dependent upon such forms of recreation. In comparison, there would be greater opportunity for visitors to engage in non-

motorized activities (e.g., hiking, back packing, horseback riding) that would benefit businesses dependent upon non-motorized forms of recreation. Overall impacts would range from minor to moderate, being strongest felt by the smaller, more tourist-oriented communities (e.g., Fredonia, Virgin River Communities, Bunkerville, Marble Canyon Area, Page, and Big Water) surrounding the Monuments.

In the Arizona Strip FO, the most concentrated and widest variety of motorized, non-motorized, and mechanical use would occur within the Rural TMA, which would comprise nine percent of the Arizona Strip FO under Alternative B. Travel in this TMA would primarily affect those users living within and adjacent to the Monuments. Although most travel within the Rural TMA would involve locals and not bring in outside dollars, travel opportunities serving recreational, casual, traditional, commercial, education, and private access needs would motivate individuals and businesses to move into the area. Such opportunities would also improve the style of living within the communities involved, potentially increasing property values. Alternative B, however, would concentrate more on non-motorized forms of recreation activities, specifically within the Primitive TMA, which would make up 37 percent of the Arizona Strip FO. Delineating 40 percent of the planning area under Specialized TMA would allow for access into the Primitive TMA for recreational purposes. This would allow opportunities for visitors to engage in non-motorized activities (e.g., hiking, back packing, horseback riding) that would benefit businesses dependent upon non-motorized forms of travel, although it would limit some opportunities for motorized forms of travel. Overall impacts would range from minor to moderate, being strongest felt by the smaller, more tourist-oriented communities nestled within the Arizona Strip FO (e.g., Marble Canyon Area, Colorado City, and Littlefield).

Impacts from Vegetation and Fire and Fuels Management

Under Alternative B, no areas within the entire Planning Area would be allocated to sustained yield timber harvest. Since lands in the Planning Area do not support large, sustainable commercial quantities of woodland resources, impacts would be negligible. In the Monuments, impacts would be the same as described under Alternative A. In the Arizona Strip FO, the sale, collection, or use of vegetative materials (e.g., native seed, medicinals, landscape mulch, posts, fuel wood, Christmas trees, lumber, etc.) would be allowed in the Arizona Strip FO by permit only. This would benefit individuals living within or adjacent to the planning areas. Overall use would be minimal, resulting in negligible impacts area-wide. Some businesses relying on vegetative materials (e.g., nurseries, individual who sale firewood, ranchers needing on poles for fences, etc.) could experience minor economic impacts

Impacts from Fish and Wildlife

Additional emphasis on habitat management for healthy self-sustaining mule deer populations and providing quality buck hunting opportunities would improve trophy deer numbers and potentially increase hunter interest in Parashant. Additional emphasis on maintaining healthy, self-sustaining populations of bighorn sheep, pronghorn antelope, Kaibab squirrels, cottontail

rabbits, waterfowl, game birds, carnivores, and furbearers would also support hunting and/or wildlife viewing throughout the Planning Area. Maintaining access to public lands with fish and wildlife hunting and viewing opportunities as determined in the route evaluation/designation process would also benefit hunters. Such actions would increase the benefit to businesses supporting hunting and wildlife viewing in the surrounding communities. As under Alternative A, continuing to manage the Mt. Trumbull Watchable Wildlife Area would also continue to attract visitors into the area. Since overall hunter/viewer numbers would remain small, overall economic impacts would be negligible; however, some guide services/outfitters may experience minor impacts.

Impacts from Minerals (Arizona Strip FO only)

Impacts to gypsum mining operations south of St. George would be similar to those described under Alternative A. Alternative B would close 405,353 acres, nearly twice as many acres to mineral material disposals compared to Alternative A. This would limit the areas where sand and gravel needed for community development could be collected, impacting both the companies providing the mineral material and communities in need of such material. Impacts would be minor.

Impacts from Livestock Grazing

Alternative B proposes the greatest reduction in active AUMs and would thus have the greatest reduction in economic contributions to the study area among the five alternatives. Under Alternative B, AUMs would be reduced by 9,165 over the three planning areas, which is a 5 percent reduction compared to Alternative A. Such a reduction in AUMs would result in a loss of over $822 thousand in total economic activity, nearly $146 thousand in personal income, 14 jobs, and nearly $25 thousand in indirect business taxes (see Table 4.3). Since the agricultural and farming sector, which includes livestock operations, is a relatively small contributor to the study area's economy, overall impacts due to the 5 percent decrease in livestock grazing contributions to the study area's socioeconomic resources would be negligible. However, impacts to specific ranch operations and those directly involved in such operations (employees, suppliers, etc.) may be minor to moderate.

In Parashant under Alternative B, AUMs would be reduced by 4,861, which is a nearly a 13 percent reduction compared to Alternative A. Such a reduction in AUMs would result in a loss of $436,032 in total economic activity, $77,484 in personal income, 7 jobs, and $13,027 in indirect business taxes (see Table 4.3). Overall impacts due to the 13 percent decrease in livestock grazing contributions to the study area's socioeconomic resources would be negligible, although impacts to specific ranch operations and those directly involved in such operations may minor to moderate.

In Vermillion, AUMs would be reduced by 291, which is a just under a 1 percent reduction compared to Alternative A. Such a reduction in AUMs would result in a loss of $26,103 in total economic activity, $4,639 in personal income, the equivalent to 0.4 job, and $780 in indirect business taxes (see Table 4.3). Overall impacts due to the less than 1 percent decrease in livestock grazing contributions to the study area's socioeconomic resources would be negligible, although impacts to specific ranch operations may be minor.

In the Arizona Strip FO, AUMs would be reduced by 4,013, which is a 3.5 percent reduction compared to Alternative A. Such a reduction in AUMs would result in a loss of $359,966 in total economic activity, $63,967 in personal income, 6 jobs, and $10,755 in indirect business taxes (see Table 4.3). Overall impacts due to 3.6 percent decrease in livestock grazing contributions to the study area's socioeconomic resources would be negligible, although impacts to specific ranch operations may be minor.

Impacts from Recreation

Overall impacts from increased visitor use would be similar as described under Alternative A. Additional restrictions placed on camping, firewood collecting, sensitive species habitats, concessions, SRPs, geocaching, and recreational stock use could discourage some visitors. The potential to place visitor limits, supplemental rules, or restrictions when carrying capacities are exceeded could put a cap on visitation and thus limit recreation-driven economic growth. Not allowing any motorized speed events in the Arizona Strip FO, especially the Rhino Rally, would hurt local businesses that benefited from such large-scale events in the past. Overall impacts would be negligible in the short term, but could range from minor to moderate in the long term.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A for the Monuments. Impacts would also be similar to Alternative A for the Arizona Strip FO, with the exception that 1,508 less acres would be available for sale, R&PP sale, and/or exchange, reducing the amount of economic development resulting from such actions. However, none of the lands made available under Alternative B would be restricted to exchanges only, making it easier to purchase such lands and used for residential, commercial, or light industrial development. Overall impacts could range from minor to moderate in the communities directly affected.

Alternative C

Impacts from Travel Management

Impacts in the Monuments would be similar as described under Alternative A due to no roads being open to motorized and mechanized cross-country vehicle travel. However, most of the roads open to the public would have special mitigating measures assigned to them, which could lead to some reduced recreation opportunities. Such impacts would be minimal compared to

Alternative B. As a result, the impact to local businesses in communities near the Monuments that are compatible with motorized, and to a less extent, non-motorized activities would be negligible to minor. Ranchers and other permittees would be allowed access to their operations by means of administrative use only roads, limiting impacts to such operations.

In the Arizona Strip FO under Alternative C, 678 more acres of BLM lands would be open to motorized and mechanized cross-country vehicle travel compared to Alternative A. This would provide additional recreational opportunities for OHV users and other off-road enthusiasts, although the opportunities for such activities would remain limited. Economic impacts would thus remain negligible. Impacts due to the preliminary route designation for the Arizona Strip FO would be the same as under Alternative A. Within the Ferry Swale Sub-region, the public would have access to 4 fewer miles of roads for recreating and exploring purposes compared to Alternative A, and special mitigating measures would be applied to most of these miles. This would decrease the economic benefit stemming travel-related recreation within the Ferry Swale area, although not as much as under Alternative B. Similar impacts would occur in the Littlefield and St. George Basin sub-regions. Overall impacts would be minor. Ranchers and other permittees would be allowed access by means of roads open to administrative use only, reducing the intensity of impacts on such users.

In the Monuments, there would be fewer restrictions on motorized forms of recreation and less emphasis on non-motorized form of recreation when compared to Alternative B, with the Primitive TMA comprising 70 percent in each Monument, 17 percent less for Parashant and 21 percent less for Vermilion than under Alternative B. This would slightly increase opportunities for motorized forms of travel, especially recreation-related travel, and positively affect those businesses dependent upon such forms of travel surrounding the Monument. However, there would be less opportunity for visitors to engage in non-motorized activities (e.g., hiking, back packing, horseback riding) than under Alternative B that would slightly affect businesses dependent upon non-motorized forms of travel. Overall impacts would be minor, being strongest felt by the smaller, more tourist-oriented communities surrounding the Monuments.

In the Arizona Strip FO, most concentrated travel would occur within the Rural TMA, which would comprise 11 percent of the Arizona Strip FO under Alternative C, which is 34 percent more than under Alternative B. As a result, Alternative C would have a slightly more positive impact on local communities in terms of providing access to BLM lands. Alternative C would concentrate slightly less on non-motorized forms of recreation activities, as the Primitive TMA would comprise less than 1 percent of the Arizona Strip FO when compared to Alternative B. There would thus be a slightly greater impact to local economies in terms of providing a wider opportunity of travel opportunities, especially motorized forms of recreation that tend to generate more economic benefits to local communities.

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative A for the Monuments and the same as Alternative B for the Arizona Strip FO.

Impacts from Fish and Wildlife

Impacts would be similar to that described under Alternative A with the exception that four additional watchable wildlife areas would be managed in Parashant, one in Vermilion, and five in the Arizona Strip FO. Such additional watchable wildlife areas would potentially attract additional visitors to the area, who would bring in a few more visitor dollars to the local economies. Impacts would be negligible in the short term, but potentially minor in the long term.

Impacts from Minerals (Arizona Strip FO only)

Impacts to gypsum mining operations south of St. George would be similar to those described under Alternative A. An additional 9,181 acres would be closed to mineral material disposals compared to Alternative A, which is minimal compared to Alternative B and thus would result in negligible economic impacts.

Impacts from Livestock Grazing

Under Alternative C, AUMs throughout the Planning Area would be reduced by 840, which is a 0.5 percent reduction compared to Alternative A. Such a reduction in AUMs would result in a loss of over $75 thousand in total economic activity, over $13 thousand in personal income, 1 job, and $2,251 in indirect business taxes (see Table 4.3). Overall impacts due to the 0.5 percent decrease in livestock grazing contributions to the study area's socioeconomic resources would be negligible. Impacts to specific ranch operations would be negligible to minor.

In Parashant under Alternative C, AUMs would be reduced by 840, which is a 2.2 percent reduction compared to Alternative A. Such a reduction in AUMs would result in a loss of $75,348 in total economic activity, $13,389 in personal income, 1 job, and $2,251 in indirect business taxes (see Table 4.3). Overall impacts due to the 1.8 percent decrease in livestock grazing contributions to the study area's socioeconomic resources would be negligible. Impacts to specific ranch operations would be negligible to minor.

For Vermilion and the Arizona Strip FO, impacts under Alternative C would be the same as under Alternative A due to no differences in active AUMs proposed.

Impacts from Recreation

Overall impacts from increased visitor use would be similar as described under Alternative A.

Fewer restrictions placed on camping in the Monuments compared to Alternative B by allowing camping in existing or disturbed areas could provide more opportunities for individuals to camp in the Monument, extending their stay and potentially spending more money in the area. Identifying four new SRMAs in each of the Monuments and four new ones in the Arizona Strip FO could help increase visitor use in the area and provide some minor economic benefit. Fewer restrictions on concessions, SRPs, geocaching, and recreational stock use compared to Alternative B could allow for increased visitor use, although increases would be slight and result in a negligible economic impact. Allowing motorized speed events in the Arizona Strip FO, such as the Rhino Rally, albeit spatially limited in a motorized speed event area, would continue to provide local businesses to receive economic benefits from such large-scale events. The potential to place visitor limits, supplemental rules, or restrictions based on LAC models could put a cap on visitation and thus limit recreation-driven economic growth. Impacts would be negligible in the short term, but could range from minor to moderate in the long term.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A in the Monuments. Impacts would also be similar to Alternative A for the Arizona Strip FO, with the exception that an additional 130 more acres would be available for sale, R&PP lease/sale, and/or exchange, reducing the amount of potential economic development resulting from such actions. Due to the small amount of land, impacts would be negligible. Similar to Alternative B, which proposed 1,638 less acres for disposal, none of the lands made available under Alternative C would be restricted to exchanges only, making it easier to purchase such lands and used for residential, commercial, or light industrial development when compared to Alternative A. Overall impacts could range from minor to moderate in the communities directly affected.

Alternative D

Impacts from Travel Management

Impacts in the Monuments would be similar to that described under Alternative A due to no roads being open to motorized and mechanized cross-country vehicle travel, However, as under Alternatives B and C, most of the roads open to the public would have special mitigating measures assigned to them, which could lead to some reduced recreation opportunities. Such impacts would be less intense compared to Alternatives B and C as Alternative D proposes more open roads without restrictions. As a result, the impact to local businesses in communities near the Monuments that are compatible with motorized, and to a less extent, non-motorized activities would be negligible to minor. Ranchers and other permittees would be allowed access to their operations by means of administrative use only roads, limiting impacts to such operations

Under Alternative D in the Arizona Strip FO, 7,186 acres of BLM lands would be open to motorized and mechanized cross-country vehicle travel; only 6,383 more acres than Alternative A, and 5,705 fewer acres than Alternative C. This would provide more recreational

opportunities for OHV users and other off-road enthusiasts than under Alternative A or C. Economic impacts would be negligible. Within the Ferry Swale Sub-region, the public would have access to 1 fewer mile of road for recreating and exploring purposes compared to Alternative A, and special mitigating measures would be applied to most of these miles. This would decrease the economic benefit stemming travel-related recreation within the Ferry Swale area, although not as much as under Alternatives B and C. Overall impacts would be minor. Ranchers and other permittees would be allowed access by means of roads open to administrative use only, reducing the intensity of impacts on such users.

In Parashant, there would be fewer restrictions on motorized forms of recreation and less emphasis on non-motorized form of recreation when compared to Alternative B and C, with Primitive TMA comprising 66 percent of the Monument (23 percent less than under Alternative B). This would increase opportunities for motorized forms of travel, especially recreation-related travel, and positively affect those businesses dependent upon such forms of travel surrounding the Monument. However, there would be less opportunity for visitors to engage in non-motorized activities (e.g., hiking, back packing, and horseback riding) then under Alternative B or C that would slightly affect businesses dependent upon such forms of travel. Overall impacts would be minor, being strongest felt by the smaller, more tourist-oriented communities surrounding Parashant.

In Vermilion and the Arizona Strip FO, impacts would be similar to those described under Alternative C due to the all four TMA sizes (within a 1 percent difference).

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative A for the Monuments and the same as Alternative B for the Arizona Strip FO.

Fish and Wildlife

Impacts would be the same as described under Alternative C.

Impacts from Minerals (Arizona Strip FO only)

Impacts to gypsum mining operations south of St. George would be similar to those described under Alternative A. There would be more opportunities for mineral material disposal operations as 12,358 fewer acres would be closed to such activities compared to Alternative A. Impacts would be negligible.

Impacts from Livestock Grazing

Overall impacts from reduced AUMs would be the least under Alternative D compared to all the other Alternatives, with the exception of Alternative A. Compared to Alternative A, AUMs for the entire Planning Area would be reduced by 382, or 0.2 percent. This would result in a loss of over $34 thousand in total economic activity, slightly over $6 thousand in personal income, the equivalent of 0.6 jobs, and slightly over $1,000 in indirect business taxes (see Table 4.3). Overall impacts due to the 0.2 percent decrease in livestock grazing contributions to the study area's socioeconomic resources would be negligible, as would impacts to specific ranch operations.

In Parashant under Alternative D, AUMs would be reduced by 382, which is a 1 percent reduction compared to Alternative A. Such a reduction in AUMs would result in a loss of $34,265 in total economic activity, $10,871 in personal income, 0.6 jobs, and $1,024 in indirect business taxes (see Table 4.3). Overall impacts due to the 1 percent decrease in livestock grazing contributions to the study area's socioeconomic resources would be negligible, as would impacts to specific ranch operations.

For Vermilion and the Arizona Strip FO, impacts under Alternative D would be the same as under Alternative A due to no differences in active AUMs proposed.

Impacts from Recreation

Overall impacts from increased visitor use would be similar as described under Alternative A. Impacts from allowing dispersed camping in existing or disturbed sites in the Monuments would have the same impacts as described under Alternative C. Impacts from SRMA allocations would be the same as described under Alternative C, with the exception that the three additional SRMAs in the Arizona Strip FO would potentially attract more visitors to the area and benefit local economies, although such impacts would be minor. The potential to place visitor limits, supplemental rules, or restrictions based on case-by-case studies could put a cap on visitation and thus limit recreation-driven economic growth. Impacts would be negligible in the short term, but could range from minor to moderate in the long term.

Actively seeking concession and vending lease proposals in the Arizona Strip FO would potentially create more opportunities to service the growing visitor populations. Allowing motorized speed events in the Arizona Strip FO on a case-by-case basis would be less restrictive than under Alternative C and thus create the conditions for potentially more such events, which would benefit the local economy.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A for the Monuments, but the same as described under Alternative C for the Arizona Strip FO.

Alternative E: Proposed Plan

Impacts from Travel Management

Impacts in the Monuments would be similar to that described under Alternative A due to no roads being open to motorized and mechanized cross-country vehicle travel. However, the public would have access to 311 fewer miles of roads in Parashant and 69 fewer miles of roads in Vermilion for purposes of exploring and recreating compared to Alternative A and, as under Alternatives B, C, and D, most of the roads open to the public would have special mitigating measures assigned to them, which could lead to some reduced recreation opportunities. The impacts from limiting the number of visitors seeking motorized forms of recreation and access to particular destinations in the Monument for either motorized or non-motorized forms of recreation would be greater than under Alternatives A and D, but less when compared to Alternatives B and C . Overall impact to local businesses in communities near Parashant that are compatible with motorized, and to a less extent, non-motorized activities would be minor. Impacts to ranchers and other permittees would be negligible to minor

In the Arizona Strip FO, impacts from areas open to motorized and mechanized vehicle use would be the same as those described under Alternative D. Under Alternative E, 2 fewer miles would be open to motorized travel by the public within the Ferry Swale Sub-region compared to Alternative D and 3 less compared to Alternative A, decreasing the economic benefit stemming from such activities within the Ferry Swale area. Impacts would be negligible. The same number of miles of roads would be open to motorized travel throughout the remainder of the Arizona Strip FO as under Alternative A, resulting in the similar socioeconomic impacts.

Impacts from TMA delineations in the entire Planning Area would be similar to those described under Alternative D due to similar acres delineated (within a 1 percent difference).

Impacts from Vegetation and Fire and Fuels Management

Impacts would be the same as described under Alternative A for the Monuments and the same as Alternative B for the Arizona Strip FO.

Impacts from Fish and Wildlife

Impacts would be the same as described under Alternative C.

Impacts from Minerals (Arizona Strip FO only)

In the Arizona Strip FO, impacts to gypsum mining operations south of St. George would be similar to Alternative A. An additional 71,967 acres would be closed to mineral material

disposals compared to Alternative A. This is more acres proposed closed than Alternatives C and D, but less than under Alternative B. Impacts would be from negligible to minor.

Impacts from Livestock Grazing

Under Alternative E, AUMs for the entire Planning Area would be reduced by 1,113, or 0.6 percent compared to Alternative A. Under Alternative E, there would be a loss of over $101 thousand in total economic activity, $18,028 thousand in personal income, the equivalent of nearly 2 jobs, and over $3,000 in indirect business taxes (see Table 4.3). Overall impacts due to the 0.6 percent decrease in livestock grazing contributions to the study area's socioeconomic resources would be negligible, as would impacts to specific ranch operations.

In Parashant impacts would be similar to those described under Alternative C due to the same number of AUMs that would be reduced (840).

For Vermilion, impacts would be similar to those described under Alternative B due to the same number of AUMs that would be reduced (291). For the Arizona Strip FO, impacts under Alternative E would be the same as under Alternative A due to no differences in active AUMs proposed.

Impacts from Recreation

Overall impacts from increased visitor use would be similar as described under Alternative A. Impacts from allowing dispersed camping in existing or disturbed sites in the Monuments would have the same impacts as described under Alternative B. Impacts from SRMA designations would be the same as described under Alternative D. The potential to place visitor limits, supplemental rules, or restrictions based on carrying capacities supplemented by LAC models could put a cap on visitation and thus limit recreation-driven economic growth. Impacts would be negligible in the short term, but could range from minor to moderate in the long term.

In the Arizona Strip FO, impacts from dispersed camping would be the same as under Alternative A, while impacts from concession lease proposals, SRP administration, and motorized speed events would be the same as under Alternative C.

Impacts from Lands and Realty

Impacts would be the same as described under Alternative A for the Monuments, but the same as Alternative C for the Arizona Strip FO.

ENVIRONMENTAL JUSTICE

Impacts to Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," requires each agency to identify and address disproportionately high and adverse effects on human health or environmental effects of its activities on minority and low-income populations.

Chapter 3 established the socioeconomic study area is predominately white. The exceptions include Coconino County, Arizona; Clark County, Nevada; the community of Page, Arizona; and the Kaibab Paiute Tribe. No disproportionate adverse impacts to these areas of higher density minority populations would occur from implementation of any of the management actions, resource programs, or objectives proposed under any of the alternatives. Impacts would thus be negligible.

American Indians within the Study area have subsistence use (e.g., pinyon nut harvesting) and cultural ties to BLM and NPS lands in the Planning Area. Refer to the discussions on impacts to resources of importance to American Indians within the Cultural Resources section of this chapter for a discussion of impacts to such subsistence uses.

Chapter 3 also established that roughly half of the communities within the study area fell beneath the national poverty level for families. No disproportionate adverse impacts to low-income populations would occur from implementation of any of the management actions, resource programs, or objectives proposed under any of the alternatives. Impacts would thus be negligible.

HEALTH AND SAFETY

Impacts to Health and Safety

While 16 abandoned mines throughout the Planning Area are considered public safety hazards and/or suspected environmental concerns due to potentially containing hazardous materials, access to these mines would be controlled with warning signs and barriers, with some being reclaimed or closed subject to funding. None of the management actions would increase public exposure to the risks associated with these abandoned mines. As a result, impacts would be negligible.

Remediation of contaminated and hazardous sites is necessary for compliance with applicable federal and state rules and regulations. No hazardous or solid waste sites are known to occur on public lands within the Planning Area. Incidental dumping of hazardous materials occurs, but is rare and concentrated mostly in close proximity to towns and highways primarily within the Arizona Strip FO. Public health and safety management actions have been proposed under all

alternatives for all three planning areas that address prevention and cleanup of such sites, as well as other health and safety concerns. None of the management actions proposed by the alternatives would require the handling, storage, or release of hazardous, toxic, or unapproved solid wastes that would cause health and safety concerns. Small amounts of fuels, chemicals, or other vegetation treatment products would be used throughout the Planning Area, but amounts would be relatively small and mostly applied away from populated areas. As a result, health and safety impacts would be negligible and not analyzed any further.

CUMULATIVE IMPACTS

Cumulative impacts are those effects on the environment that result from incremental impacts of management direction contained in this Proposed Plan/FEIS when added to the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency (federal, tribal, state, or local) or private entity undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508). Analysis focuses on the cumulative impacts of the Proposed Plan for this FEIS and other actions both within and outside of the Planning Area.

Potential cumulative impacts, projects, and actions in the Planning Area were determined by examining other plans in the region, by talking with local governments and state and federal land managers, and from information provided by the BLM and NPS staff. The area of primary concern for cumulative impacts related to this Plan is northern Mohave and Coconino counties north of the Grand Canyon in Arizona, southern Washington and Kane counties in Utah, and eastern Clark County and southeastern Lincoln counties in Nevada. Projects outside these areas were also considered if they have the potential to affect resources in the region. Cumulative impact analyses are also presented at the end of each impact topic discussion in this chapter

TIMEFRAME FOR ANALYSIS

The timeframe for this cumulative impact analysis encompasses past activities for the past one hundred years in the Planning Area. It also includes present activities and anticipated future activities that may extend 20 years into the future, which is the assumed life of the management plans.

Past Actions

Federal designations and administration: Much of the land in the region is contained within national parks, national forests, NRAs, National Monuments, wilderness areas, and tribal reservations. These national parks, Monuments, and wilderness areas are withdrawn from mineral entry. All are retained under federal or tribal administration and not available for sale or exchange. This preserves open space, and natural and cultural landscapes in the region, but it also puts developmental pressure on the private and state lands available for development, most of which would likely be developed for housing, infrastructure needs, and commercial uses.

Population/Community Growth, Homesteading: Homesteading and community development began on the Arizona Strip and in the region in the 1850s. Mt. Trumbull, Little Tank, and other homesteading areas were founded from 1916-1930s. Over much of the region, population gradually increased until the 1980s when population growth accelerated. With the last census in 2000, St. George, Utah became an urban area with more than 50,000 residents.

Tourism: With the creation of the national parks, Monuments, and NRAs in the region, the increase in tourism has steadily risen over the past 100 years, with a dramatic increase in visitation since the 1970s. Local economies have gradually shifted from a reliance on extracting resources to economies based on the services industries and tourism

Transportation/Access: Wagon roads across the Arizona Strip began to be used in the 1850s. Some followed earlier American Indian trails. Regional roads, such as the Honeymoon Trail, connected the early communities of southern Utah and northern Arizona with communities in central and southern Arizona, northern Utah, southern California, and Mexico. Construction of the Marble Canyon Bridge in 1928 provided more automobile access across the Arizona Strip. Construction of Interstate 15 through the Virgin River Gorge in the mid 1970s brought increasing traffic and visitors to this region.

Livestock Grazing: Grazing of sheep and cattle and the building of associated facilities and operations began on the Arizona Strip in the 1850s and increased dramatically during the 1880s and 1890s. Current stocking rates, however, are much lower.

Drought: Occasional periods of drought occurred and affected pastures, crops, water tables levels, presence of water sources, and vegetation. Drought also raised the potential for wildfires. Between 1998 and 2004, most of the western U.S. experienced drought, with the Arizona Strip experiencing extreme drought.

Wildland Fire: Fire management and fire history within the Planning Area have been affected by past actions that altered vegetation including logging, grazing, fire suppression efforts, and the spread of invasive vegetation. Euro-Americans began logging ponderosa pine during the 1870s at Mt. Trumbull. Logging accelerated with the creation of the Dixie National Forest in 1903 when Forest Service employees and contractors were hired to log areas and fight any fires that started at Mt. Trumbull, Mt. Logan, Mt. Dellenbaugh, and in the Parashant area. In the early 1930s, forest administration for the Mt. Trumbull/Mt. Logan unit was transferred to the Kaibab National Forest. The other Forest Service units in the Planning Area were taken out of Forest Service administration. In 1973, the Mt. Trumbull/Mt. Logan unit was transferred to BLM administration. Past fire-suppression activities have resulted in dense or over-mature stands of pinyon-juniper, interior chaparral, sagebrush, and ponderosa pine. Dense, closed stands of ponderosa pine are at high risk of stand-replacing wildland fire. Fire suppression and past livestock grazing practices have altered grasslands through increased shrub densities and loss of perennial grasses. Exotic annual grasses have increased the number and size of fires, killing

native vegetation and increasing the proliferation of exotic annual grasses. Thousands of acres of Mojave Desert shrub have been converted to steppe or grassland. The spread of tamarisk in riparian areas has dramatically increased flammable fuel loads. Between 1980 and 2003, a total of 178,804 acres were burned by wildfires in the Planning Area, which equals to an average of 85 wildland fire starts or 7,450 acres burned per year during that period.

Uranium Mining: Uranium exploration began in the 1950s on the Arizona Strip, but development and production did not occur until the opening of six uranium mines in the early 1980s. When the price of uranium fell in the late 1980s, production also fell and three of the mines were closed and reclaimed. Three mines remain on stand-by basis waiting for the price of uranium to rise.

Gypsum Mining: Commercial production of gypsum began in 1990 near Black Rock Gulch, south of St. George, Utah. Annual production in 2001 was approximately 700,000 tons. An additional gypsum mine in Cedar Pockets has also operated periodically during the past few years.

Grand Canyon Overflight Rules: Since the passage of the Overflights Act in 1987, which limited below-the-rim flights in the Grand Canyon, more private sightseeing flights north of the Grand Canyon occur over the southern portion of the Planning Area.

Present Actions

Federal Designations and Administration: The addition of two Monuments on the Arizona Strip (Parashant, and Vermilion) add to the acreage of regional land which protects open space and cultural and natural landscapes, is withdrawn from mineral entry, and remains under federal administration.

Regional Population/Community Growth: Explosive population growth in Washington County, Utah, and Clark County, Nevada is rapidly changing the socioeconomic character of the region from a rural to an urban area.

Transportation/Access: See below for discussion on reasonably foreseeable future actions.

Livestock Grazing: Approximately 3,007,560 acres are available for grazing in the Planning Area, with approximately 181,462 AUMs permitted. AMP implementation, watershed plans, and the Standards and Guides process allow for the examination of each allotment and implementation of measures to heal historical impacts to water, soil, and vegetative resources.

Drought: In 2003/2004, all permitted livestock grazing animals were removed from the Planning Area because of drought. In addition, six years of drought from 1998 to 2004 affected vegetation. Widespread mortality of pinyon-juniper and ponderosa trees is also occurring throughout the Planning Area due to this drought.

Wildland Fire: See below for discussion on reasonably foreseeable future actions.

Vegetation Treatments: See below for discussion on reasonably foreseeable future actions.

Noxious Weeds (including invasive non-native grasses): See below for discussion on reasonably foreseeable future actions.

Gypsum Mining: Gypsum mining is presently occurring at the Domtar Ridge mine near Black Rock Gulch.

Grand Canyon Overflight Rules: See below for discussion on reasonably foreseeable future actions.

Increasing demand for Non-motorized Recreation: See below for discussion on reasonably foreseeable future actions

Reasonably Foreseeable Future Actions

Federal Designations and Administration: Completion of the Parashant, Vermilion, and Arizona Strip FO Management Plans, the Kanab RMP, Grand Canyon National Park Back Country Management Plan, and associated implementation plans would involve some further road closures in the region, which would protect open space and natural and cultural resources while restricting motorized access. Withdrawals from mineral entry in National Monuments, national parks, NRAs, and wilderness areas would continue.

Regional Population/Community Growth: The explosive population growth in the region is one of the factors that could most influence the Planning Area in the long term. Washington and Clark counties, both directly adjacent to the western portion of the Planning Area, are poised to become major urban areas. St. George recently became an urban area during the last census and Mesquite is one of the fastest growing communities in the country. The Lincoln County Land Act will provide more acreage for development and more population growth in Mesquite.

Developments include the new construction of the Southern Corridor four-lane highway from Milepost 2 on Interstate 15 to the new St. George Airport, which is projected to be completed by 2011. The Southern Corridor will eventually be connected to Hurricane, Utah, and will provide access that is more direct to Zion National Park, Grand Canyon National Park, and Glen Canyon NRA. Development of the South Block Utah State Trust Lands would lead to development pressure on Arizona State Trust Lands directly south of St. George. It is reasonably foreseeable that Arizona State Trust Lands in this area of the St. George Basin could be developed during the life of this Plan. The South Block Development just north of these lands in Utah is projected to eventually have a population of 25,000. It is not inconceivable that a similar community may develop due south in Arizona once water becomes available for development. This dramatic

increase in population would affect the nature and use of public lands in the vicinity of St. George as well as increased use in the Monuments, particularly Parashant.

Similar population increases may also be expected in nearly all of the communities near the Planning Area such as the Mesquite/Beaver Dam/Littlefield area, the Kanab/Fredonia area, and in the Apple Valley/Colorado City/Hildale areas. Population in Washington County, Utah is projected to increase from 90,354 in 2000 to 251,896 by 2020. Kane County is expected to grow from 6,046 in 2000 to 8,359 in 2020. The twin cities of Colorado City, Arizona and Hildale, Utah are expected to grow from 5,229 in 2000 to 11,149 in 2020. (See Table 4.4 below and the socioeconomic section in Chapter 3 of this Plan.)

Table 4.4: Population of select towns/cities/counties in the Planning Area

Location	1990	2000	2010	2020	2030
Coconino County, AZ	96,591	116,320	147,352	169,343	189,868
Fredonia	1,207	1,036	1,507	1,671	1,811
Page	6,598	6,809	11,128	13,057	14,841
Mohave County, AZ	93,497	155,032	194,403	236,396	270,785
Colorado City	2,426	3,334	5,500	6,626	7,598
Kane County, UT	5,169	6,046	6,618	8,359	9,783
Kanab	3,289	3,564	3,825	4,831	5,654
Washington County, UT	48,560	90,354	162,544	251,896	353, 922
St. George	28,502	49,663	85,144	132,497	185,809
Clark County, NV	741,459	1,375,765	1,827,770	--	--
Mesquite	1,871	9,389	21,000[1]	--	--

Source: All 1990 and 2000 numbers, US Census Bureau; all Arizona projections, Arizona Dept. of Economic Security, Research Administration: all UT projections, Five County Association of Governments, St. George, UT; Nevada County Projections, Department of Cultural; Mesquite projections, City of Mesquite ([1]2008 estimate)

Transportation/Access: Utah regional transportation projects, including the construction of a new interchange at Milepost 2 of Interstate 15 just north of the Arizona/Utah border, would add to the cumulative impact to the Planning Area. The Southern Corridor would then be constructed east from this interchange. This would allow direct access off the River Road interchange and on to the Arizona Strip, increasing visitation and impacts to Parashant and the St. George Basin area of the Arizona Strip FO. Resulting development from this increased transportation network would result in an increase in population in the area, thus increasing impacts to resources in this area.

Livestock Grazing: Continuation of the Standards and Guides process would allow implementation of measures to continue to improve water, soil, and vegetation.

Drought: Future droughts are reasonably foreseeable in this region.

Wildland Fire: It is anticipated that over the next 20 years wildland fire would burn approximately 110,000 acres on the Planning Area, which is comparable to the acreage burned

over the last 20 years (1984-2003). The number of acres burned would continue to vary greatly from year to year. Appropriate Management Response would be used for managing wildland fires based on firefighter and public safety, fire management allocations, criteria in the Fire Management Plan, and resource objectives.

Noxious Weeds (including invasive non-native grasses): The BLM and NPS would continue to eradicate noxious weeds, implement actions to decrease their spread, and educate the public about noxious weed threats and prevention methods. Actions would be implemented to hinder the spread of invasive non-native grasses and foster healthy native and endemic species.

Uranium Mining/Exploration: The price of uranium is rising and is currently about $20/ton. If the price continues to increase and reaches or exceeds $25/ton, it is reasonably foreseeable that uranium mines may be re-opened in the near future, with the potential for further uranium exploration and development.

Gypsum Mining: The potential exists for additional open pit gypsum mines to be operating in the Cedar Pocket and Black Rock Gulch areas.

Land Tenure Adjustments: Future land exchanges may occur between the BLM, NPS, and the State of Arizona when the State is given authority to remove isolated parcels of state trust lands in the Monuments and wilderness areas and consolidate them for better future management. Depending on the location of state trust lands, there may be the potential to develop these lands into communities or extensions of existing communities. This could foster more development of now remote and undeveloped areas and place more pressure for use of these lands.

Lincoln County Land Act: The Lincoln County Land Act of 2000 transferred ownership of 13,500 acres of public land north and west of Mesquite, Nevada to private ownership. Development of this land would result in a considerable expansion of Mesquite. Assuming that development of all the acres would be at medium density of 7 housing units/acre and that a minimum of 2 individuals would occupy each housing unit, then an increased regional population of 189,000 people could occur in the coming years. Because it is directly adjacent to the Planning Area on the western edge of the Arizona Strip, this increased population would probably result in a dramatic increase in visitation and use of the Arizona Strip along with other public lands in the region.

Airport Expansions (St. George, Mesquite, Colorado City): Construction of the new St. George Airport in 2011 would increase air traffic, allow for larger jets and planes, and provide for more commercial and economic development. It would eventually lead to more growth and urbanization, which would translate into more use and pressure on federal lands in and surrounding the St. George Basin. The undeveloped open and scenic landscapes would become more valuable for recreation and property values. More and louder planes may affect soundscapes for approach areas near the airport. Within 40 miles of this proposed airport are the Beaver Dam, Paiute, and Cottonwood Points wildernesses, the northern one-third of Parashant,

Little Black Mountain ACEC/Public Use Site, and a portion of the Old Spanish NHT. These areas could also be impacted.

Similar to the expansion of the St. George Airport, construction of the Mesquite Airport approximately 15 miles northwest of Parashant would affect that Monument and the western portion of the Arizona Strip FO by allowing for more commercial and economic development in the area, increasing population growth, and adding more use and pressures on the federal lands. The proposed airport is within 25 miles of Beaver Dam Mountain Wilderness, 17 miles of Paiute Wilderness, 30 miles of Grand Wash Cliff Wilderness, 10 miles of a portion of the Old Spanish NHT, and 43 miles of Little Black Mountain ACEC/Public Use Site, all of which could be impacted.

Expansion of the Colorado City Airport would also allow more commercial and economic development and population growth in the area, but the use would probably be restricted to local traffic rather than the commercial traffic expected at the St. George and Mesquite airports. This proposed airport is within 3 miles of Cottonwood Points Wilderness, 40 miles of Beaver Dam Wilderness, 37 miles of Mt. Trumbull Wilderness, 30 miles of Kanab Creek Wildernesses and 29 miles of Little Black Mountain ACEC/Public Use Site, all of which could be impacted.

The cumulative effect of the construction and/or expansion of all three airports in the region would have a dramatic effect on the growth of the communities and the increased use and values of the surrounding public lands.

Lake Powell Water Pipeline ROW: A 120-125 mile pipeline to bring water from Lake Powell water to Sand Hollow Reservoir in the St. George Basin may be constructed around 2020 or near the end of the life of this Plan. The pipeline may have a capacity to deliver 80,000-acre feet per year. Current plans are for the pipeline ROW to follow existing highways and/or ROW corridors through Utah and Arizona. Construction of the pipeline and subsequent use of the water would allow further development in Utah, and thus more use of the federal lands in the area.

Retirement: As the baby boom generation reaches retirement age, OHV use, day use, recreational driving, and other forms of outdoor recreation in the Planning Area may increase. The retirement communities of Mesquite, St. George, and Kanab may experience accelerated population growth due to obtaining a higher ratio of the retirement population, which could also result in an increase in recreational use of public lands. With the increase in OHV registration over the past seven years, OHV use may be expected to increase in the entire region. Table 4.5 displays information on OHV registration growth in Utah over a six-year period.

Table 4.5: OHV Registration in Utah

Location	1998	2004	% Change
Kane County	306	1,167	113%
Washington County	1,654	7,876	316%

Source: Utah BLM

All of these projects, uses, and actions, when combined with each of the management alternatives, would result in cumulative impacts to various resources and resource uses in the Planning Area. Some cumulative impacts to the communities and the environment are directly related to local and regional growth. None of the alternatives would have a significant effect on regional growth and the effects of any alternative on local population growth are negligible. A summary of the probable cumulative impacts, by alternative, is presented below.

Alternative A: No Action

Under the No Action Alternative, population growth north and west of the Planning Area would continue to contribute to cumulative impacts. Effects from regional transportation projects could increase visitor use and community development, particularly in the St. George Basin and near Mesquite. Increased mining of gypsum and/or uranium could affect resources in Arizona Strip FO.

Land tenure adjustments with the Arizona State Land Department could benefit management for both federal and state land but could also encourage increasing population growth and community development, depending on where the consolidated state lands remain. The Lincoln County Land Act would result in an expansion of the community of Mesquite and increasing population and contribute to additional use of public lands. Development of the South Block near St. George would result in a new community of approximately 25,000 individuals directly north of the Arizona Strip FO. It would also result in increasing demand for and value of resources in the Arizona Strip FO and Parashant. Potential development of the block of Arizona state land south of St. George would have the same effects, as would airport expansions in the region, both of which would allow for increased population growth in the region.

Construction of the Lake Powell Pipeline would also allow for further community growth and development in the region.

Alternative B

Impacts from increased community developments and population growth mentioned under Alternative A would also apply to Alternative B. However, closing more roads to motorized traffic under Alternative B would provide more protection of open space and natural and cultural resources from increasing visitation and use of BLM and NPS lands that would result from increased population growth in the region. Effects from regional transportation projects would also be similar to Alternative A with the exception that concentration of use may occur in some areas due to the number of road closures and restrictions proposed under Alternative B.

Cumulative Impacts from land tenure adjustments and construction of the Lake Powell Pipeline would be the same as discussed under Alternative A.

Alternatives C, D, and E (Proposed Plan)

Cumulative impacts under Alternatives C, D, and E would be similar to those discussed under Alternative A.

Alternatives C, D, and E are designed to keep most of the landscape in its present condition or to return it to its natural range of variability, particularly in the Monuments and present roadless areas. Little development is expected on BLM or NPS lands within the Planning Area. Overall impacts of these alternatives are minor. Impacts to local government revenues and expenditures are also relatively minor.

MITIGATION MEASURES

Mitigation of potential impacts not already built into the alternatives is discussed below and in various sections of this document. Mitigation measures that have been developed are in the form of standard operating procedures, which apply to all alternatives and have already been assessed in discussion of impacts in this chapter. Mitigation measures can be found in Appendix 2.E (Conservation Measures for Special Status Species) and Appendix 2.N (Reclamation Stipulations). Additionally, the Standards for Rangeland Health would continue to require monitoring and application of remedies in allotments across the Planning Area to meet Land Health Standards (see Appendices 2.E and 2.H).

Monitoring would be an integral part of restoration plan development, recreation management, and adaptive management.

Most of the management direction presented in this Proposed Plan/FEIS is at the programmatic level, making it difficult to develop specific mitigation measures. NEPA analysis documents would be prepared for specific projects and mitigation would be part of the NEPA compliance process.

NPS IMPAIRMENT ANALYSIS

Archaeological and Historic Resources

Impairment of archaeological and historic resources in the NPS portion of Parashant could be expected in any case where the impacts of specific management actions are classed as *major*, pursuant to the definitions offered in the Impacts to Cultural Resources section. In these cases, the NRHP eligibility of archaeological or historic resources would be lost due to changes to one or more character-defining features coupled with diminished integrity of the resources.

Under some of the actions in Alternatives B, D, and E, major impacts on archaeological and historic resources could result from vegetation management in the Riparian, Great Basin, and Ponderosa Pine ecological zones and/or from proposed recreation, minerals, and lands and realty

decisions. In all cases where major impacts to archaeological and historic resources would be caused by particular management programs, impairment of these resources could be avoided through either avoidance or other acceptable mitigation means (e.g. data recovery) defined under Section 106 of the NHPA. In fact, the cultural resource management process specified in 36 CFR 800 would be required in cases where any Federal undertaking would have adverse effects on NRHP-eligible resources.

Resources of Importance to American Indians

Much like archaeological and historic resources, impairment of resources of importance to American Indians in the NPS portion of Parashant could be expected in any case where the impacts of specific management actions are classed as *major*, pursuant to the definitions offered in the Impacts to Cultural Resources section. In these cases, the NRHP eligibility of these sites would be lost due to changes to one or more character-defining features of the ethnographic resource or traditional use area. The action would also diminish the integrity of the resource to the extent that it no longer would be able to sustain traditional or sacred uses. Further, the action under a particular resource management plan might close off access to sacred or traditional use areas. In any case, a major impact would result in an adverse effect on the resource under 36 CFR 800.

Vegetation management practices could produce major impacts on resources of importance to American Indians under Alternatives B, C, D, and E. Under Alternative D, larger acreages proposed for vegetation treatment would create greater ground disturbance and would result in potentially major impacts on TCPs considered important to American Indians. Such impacts would be limited to the Great Basin and Ponderosa Pine ecological zones. Major impacts on resources important to American Indians resulting from the recreation management program proposed under Alternative D would be limited to specific areas within the NPS portion of Parashant.

Avoidance of American Indian sacred sites and traditional use areas is the only real means of preventing impairment of these resources. Meaningful tribal consultation may result in sufficient identification of these resources so that they could be avoided during vegetation management efforts under the Proposed Plan. Indeed, the key to avoiding impairment of resources of importance to American Indians under any of the proposed alternatives is successful and ongoing consultation with the federally recognized Tribes traditionally affiliated with the NPS portion of Parashant.

Natural Resources

Impacts to natural resources were reviewed for their potential to lead to impairment. Following the *Interim* Technical Guidance on Assessing Impacts and Impairment to Natural Resources (NPS Natural Resource Program Center, July 2003), the five alternatives were assessed at three levels: magnitude of the action, probability of a wrong decision, and consequences of the action.

Based on the information provided in the Proposed Plan/FEIS, both Alternatives C and E do not contain actions that would have major impacts on the identified resources of the NPS portion of Parashant; they would not, therefore, lead to impairment. Unavoidable adverse impacts are limited in scope and duration and would not permanently alter the character of the NPS portion of Parashant. Alternatives A, B, and D have identified actions that may lead to major impacts. If major impacts can be avoided or mitigated so that the resources would neither require an excessively long recovery (e.g., multiple generations) nor be unrecoverable altogether, then these management actions would not lead to resource impairment.

UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are impacts that remain following the implementation of mitigation measures, or impacts for which there are no mitigation measures. Some unavoidable adverse impacts occur as a result of proposed management under one or more of the alternatives, while others are a result of public use of the BLM and NPS lands in the Planning Area. For example, restoration would be the primary cause of unavoidable adverse impacts from management actions, while public uses such as livestock grazing, mineral development, and OHV use would be the primary causes of unavoidable adverse impacts by the public. Potential unavoidable adverse impacts are difficult to quantify and could extend beyond the planning period. The following sections discuss those unavoidable adverse impacts that have been identified for the proposed management direction in the Planning Area. If an impact topic is not mentioned, no important unavoidable adverse impacts to that resource or resource use were determined.

Air Quality: Smoke generated from wildfires, managed natural fires, and prescribed burns would be unavoidable, but impacts would be short term.

Water Resources: Vegetation treatments could increase sedimentation to surface waters. This impact is expected to be short term until new vegetation stabilizes the treated areas.

Soils: Vegetation treatments could increase soil erosion. This impact is expected to be short term until new vegetation stabilizes treated areas. Authorized and unauthorized OHV use would continue to be a concern as it relates to rutting, compaction, and soil erosion.

Fish and Wildlife: Vegetation treatment, particularly managed/prescribed fire and mechanical tools and techniques, could increase sedimentation in surface waters and reduce certain types of wildlife habitat. These impacts are expected to be short term until new vegetation stabilizes treated areas, and restored areas would provide better habitat for fish and wildlife in the long term. OHV use could also disturb sensitive wildlife.

Cultural Resources: OHV use and vandalism of sites would continue to adversely impact cultural resources. Natural erosion and weathering would continue to degrade cultural resources.

Visual Resources: Wildlife and vegetation treatments, particularly managed/prescribed fire and mechanical tools and techniques, would change the visual character of those areas affected. Pinyon-juniper and ponderosa pine woodlands would experience the most noticeable changes. Treated areas may display reduced or unnoticeable visual contrast once vegetation has become reestablished, or they may show signs of human intervention for decades following treatment. Mineral exploration and development in Arizona Strip FO would cause adverse but localized impacts to visual resources. Unauthorized, cross-country, OHV travel could create linear scarring of the landscape.

Recreation: Vegetation treatments and mineral exploration and development activities would displace recreation during their active periods. Once restoration is established and development areas are reclaimed, visitors could return to these areas. Changes in the amount and patterns of OHV use could result in increased conflicts between users and unanticipated changes in recreation resource conditions.

Livestock Grazing: Vegetation treatments would modify range conditions, temporarily reducing forage, and would require restricting livestock from treated areas until vegetation becomes sufficiently established to withstand grazing. In the long term, restored areas would provide improved forage for livestock.

American Indian Traditional Uses: Native plants important to American Indians would be disturbed by vegetation treatments until restoration is completed. In the long term, vegetation restoration would provide greater sustainability and populations of native plants, such as native tobacco, or more viable and productive natural vegetation.

RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

Under all alternatives, the short-term disturbances of soil, vegetation, and wildlife habitats from restoration efforts throughout the Planning Area and in specific locations such as Pakoon Spring would be more than offset by the long-term productivity of restored riparian, grassland, sagebrush, pinyon/juniper, and ponderosa pine habitats. This would be particularly true under Alternative E due to its greater emphasis on long-term restoration of habitats, including the Pakoon and Cane springs areas.

Also under all alternatives, grazing across the Planning Area and mineral extraction in the Arizona Strip FO would constitute short-term uses of the environment in various locations. Short-term grazing uses would be balanced by the long-term productivity of livestock industries. The disturbance of soils, vegetation, and wildlife habitats from minerals exploration and extraction and livestock grazing, as well as from recreation use, would reduce the long-term productivity of the environment in local areas where revegetation or restoration of the natural environment could not be fully realized over time.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

The implementation of actions in accordance with the Proposed Plan (Alternative E) may result in impacts that might be considered irreversible and/or irretrievable. Irreversible commitment of resources refers to the loss of future options and applies primarily to the effects of the use of nonrenewable resources, such as minerals, cultural resources, and soils. An irretrievable commitment of resources involves the loss of production, harvest, or use of natural resources over a period of time. For example, livestock forage production may be lost in an area that is undergoing restoration or was subject to a wildfire. The production lost is irretrievable, but the action is not irreversible. Once the area is restored, forage production would increase and livestock grazing could resume.

Implementing the alternatives would result in some, small-scale disruption to resources, some of which may become long term or permanent. Potential irreversible or irretrievable losses are described below.

Loss of soils from erosion during restoration treatments or following wildfires would be irretrievable. Changes in vegetation communities from wildfire, cheatgrass invasion, or restoration treatments may not be reversible, or may be reversible after many decades. Vegetation production lost to drought, wildfire, restoration treatments, and invasive plants would be irretrievable. Changes in vegetation communities that would result from restoring or not restoring areas may be irreversible or may be reversible only after many decades. Invasion by cheatgrass and other noxious or invasive weeds may be irreversible. The resources committed to manage weeds would be irretrievable.

The effects of a high intensity wildfire or one covering large acreage would be reversible only after several decades. Resources committed for fire suppression and rehabilitation would be irretrievable.

Changes in wildlife habitat from wildfire, invasive plants, or restoration treatments may be irreversible or may be reversible only after many decades. Effects to special status animals from authorized and unauthorized activities, wildfire, invasive plants, or restoration treatments may be irreversible. Effects to special status plants from authorized and unauthorized activities, wildfire, invasive plants, or restoration treatments may be irreversible.

Authorized mitigation of cultural sites prior to disturbance and unauthorized collecting and vandalism would result in an irreversible commitment of the resource. Authorized and unauthorized collection of fossils would result in an irreversible commitment of the resource.

Opportunities to view undisturbed settings lost during restoration treatments or mineral activities would be irretrievable. Scarring of the landscape resulting from authorized and unauthorized OHV use can be irreversible.

Disposal of public land to facilitate economic development of the communities and counties within the Arizona Strip FO would be irreversible. Authorized activities that make lands unsuitable for disposal would be minimal.

Invasion of rangelands by cheatgrass or other invasive plants may be irreversible. Loss of forage production during watershed restoration would be irretrievable.

Production of oil and gas would be an irreversible use of the resource. Closing an area to leasing would constitute an irretrievable commitment of potential resources. Mining of locatable minerals would be an irreversible use of the resource. Mining of salable minerals (e.g., sand and gravel) would be an irreversible use of the resource. Denial of the sale of mineral materials would constitute an irretrievable commitment of the resources.