

# Chapter 4

---

## Environmental Consequences



## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

### INTRODUCTION

This chapter describes the environmental consequences of implementing any of the five planning alternatives described in Chapter 2. It focuses on the potential impacts on important resources, uses, and activities described in Chapter 3. It also identifies mitigation measures that could be taken to reduce or prevent impacts to resources and users. A tabular summary of these impacts can be found at the end of this Chapter.

The analysis is organized into five broad categories.

First, the impacts on Monument Resources are analyzed. This includes impacts on paleontological, archeological, historic, and biological resources. Impacts on biological resources include impacts on vegetation, threatened and endangered plant species, relict vegetation, riparian resources, impacts of weeds, cryptobiotic soils, wildlife, threatened and endangered animal species, and impacts to the Paunsaugunt deer herd.

Second, the impacts of the alternatives on Other Environmental Factors, including many which support and protect Monument resources, are analyzed. These include impacts on surface water quality, air quality, and Wild and Scenic River values.

Third, the impacts of the alternatives on Monument Uses and Users are analyzed. This includes impacts on research activities, livestock operations, forestry product use, recreational use, outfitters and guides, scenic quality, and primitive unconfined values.

Fourth, the impacts on Local Economics are analyzed. This includes impacts on local and regional economies projected from each of the alternatives.

Fifth, Cumulative Impacts are analyzed. Cumulative impacts are the effects on the environment of each alternative when coupled with the effects of other past, present, and reasonably foreseeable future actions occurring inside and outside the Monument boundary. This includes a discussion of past and present impacts such as livestock grazing, and future actions, such as development adjacent to the Monument.

Data on the location and extent of Monument resources, while considerable, varies according to resource type and locale. Further, our understanding of the impacts on and the interplay among these resources is evolving. As our data base and knowledge improves, adaptive management measures would be considered and proposed as actions in accordance with law and regulation, including provisions for public involvement.

### ENVIRONMENTAL CONSEQUENCES

#### Analysis Assumptions and Guidelines

The following assumptions and guidelines were used to guide and direct the analysis of environmental consequences:

1. The alternatives would be implemented substantially, as described in Chapter 2, including Management Common To All Alternatives.
2. The Bureau of Land Management would have sufficient funding and personnel to implement the plan.
3. Current trends in recreation use would continue.
4. The planning period for the analysis is the next 15 years. Short-term impacts are those that would occur during the first five years of plan implementation. Long-term impacts are those that would occur beyond the first five years.
5. Specific actions to protect human life would be taken regardless of the management criteria in the plan alternatives.
6. Livestock grazing would continue to be governed by applicable laws and regulations.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

7. Research would continue to be funded, at least at current levels.

### **Analysis Assumptions and Guidelines Specific to the Alternatives**

The analysis of the alternatives is based on certain assumptions about each alternative. Those assumptions, by alternative, are summarized below. A tabular summary of the impact analysis by alternative is found in Table S.2.

#### **ALTERNATIVE A (NO ACTION)**

The majority of the Monument, 1,363,477 acres, would remain open to cross-country vehicle use. On about 15 percent of the Monument, 256,802 acres, cross-country vehicle use would be limited to existing routes. Four percent, 64,619 acres, would be closed to cross-country vehicle use.

It is assumed that a variety of visitor use sites would be constructed or existing sites would be expanded. These sites could include parking areas, trailheads, trails, signs, interpretive sites, picnic areas, and pullouts. It is assumed that 16 sites would be constructed or expanded, disturbing 8 acres.

It is assumed that the development plan for Calf Creek campground would be completed, adding a group site to that campground. The existing 21 designated primitive campsites within the Monument would continue to be used.

There would be no group size restrictions under this alternative. It is assumed that impacts from visitor use would be very high in this alternative.

New water development facilities (spring developments, troughs, pumps, pipelines, impoundments) would be constructed when needed to protect Monument resources. Maintenance of existing water developments for livestock, wildlife and visitor use would continue, subject to compliance with current policies and practices, provided Monument resources were protected.

#### **ALTERNATIVE B (PREFERRED)**

Motorized and mechanized cross-country travel would be prohibited. Approximately 818 miles of routes would be designated open to the public for street legal motorized and mechanized use. On 591 of the 818 miles open to motorized and mechanized use, non-street-legal all-terrain (ATV) and dirt bike use would be allowed.

It is assumed that a variety of visitor use sites could be constructed, or existing sites could be expanded. These sites could include parking areas, trailheads, trails, signs, interpretive sites, picnic areas, and pullouts. It is assumed that 32 sites would be constructed or expanded, disturbing 16 acres.

No developed campgrounds would be constructed. Nine primitive campsites could be designated, disturbing 18 acres.

The group size limit on 143,874 acres would be 25 people and/or animals (without a permit). On 1,541,025 acres, the group size limit would be 12 people and/or animals. Allocations could be used to maintain use at low levels on 1,571,162 acres.

New water developments (spring developments, troughs, pumps, pipelines, and impoundments) could be constructed when such facilities were determined necessary to protect Monument resources. Maintenance of existing water developments could continue, subject to an evaluation of impacts to Monument resources.

#### **ALTERNATIVE C**

Motorized and mechanized cross-country travel would be prohibited. Approximately 1,187 miles of routes would be designated open to the public for street-legal motorized

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

and mechanized use. Non-street legal ATVs and dirt bikes would not be allowed.

It is assumed that a variety of visitor use sites could be constructed, or existing sites could be expanded. These sites could include parking areas, trailheads, trails, signs, interpretive sites, picnic areas, and pullouts. It is assumed that 20 sites would be constructed or expanded, disturbing 10 acres.

No developed campgrounds would be constructed. Thirteen primitive campsites could be designated, disturbing 26 acres.

The group size limit on 712,535 acres would be 50 people and/or animals. On 972,364 acres, the group size limit would be 12 people and/or animals. Allocations could be used to maintain use levels throughout the Monument on 1,684,899 acres.

New water developments (spring developments, troughs, pumps, pipelines, and impoundments) could be constructed when such facilities were determined necessary to protect Monument resources. Maintenance of existing water developments could continue, subject to an evaluation of impacts to Monument resources.

### ALTERNATIVE D

Motorized and mechanized cross-country travel would be prohibited. Approximately 760 miles of routes would be designated open to the public for street legal motorized and mechanized use. Non-street legal ATVs and dirt bikes would not be allowed.

It is assumed that a variety of visitor use sites could be constructed, or existing sites could be expanded. These sites could include parking areas, trailheads, trails, signs, interpretive sites, picnic areas, and pullouts. It is assumed that 20 sites would be constructed or expanded, disturbing 10 acres.

No developed campgrounds would be constructed. Thirteen primitive campsites could be designated, disturbing 26 acres.

The group size limit on 113,814 acres would be 25 people and/or animals. On 1,571,085 acres, the group size limit would be 12 people and/or animals, with limited exceptions in specific areas. Allocations could be used to maintain use levels throughout the Monument on 1,684,899 acres.

New water developments (spring developments, troughs, pumps and pipelines) would not be permitted. Maintenance of existing water developments could continue,

subject to an evaluation of impacts to Monument resources.

### ALTERNATIVE E

Motorized and mechanized cross-country travel would be prohibited. Approximately 1,264 miles of routes would be designated open to the public for street-legal motorized and mechanized use. On 980 miles of the 1,264 miles designated open to street legal motorized and mechanized use, non-street legal ATV and dirt bike use would be allowed.

It is assumed that a variety of visitor use sites could be constructed, or existing sites could be expanded. These sites could include parking areas, trailheads, trails, signs, interpretive sites, picnic areas, and pullouts. It is assumed that 43 sites would be constructed or expanded, disturbing 22 acres.

One developed campground could be constructed and three primitive campsites could be designated. Construction of these areas could disturb up to 21 acres.

There would be no group size limitations on 28,133 acres. Group size limits on 190,225 acres would be 75 people and/or animals (without a special permit). On 1,466,541 acres, the group size limit would be 12 people

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

and/or animals. Allocations could be used to maintain use levels on 1,466,541 acres.

New water development facilities (spring developments, troughs, pumps, pipelines, impoundments) could be constructed when needed to protect Monument resources or to manage livestock, wildlife, recreation or watershed resources. Maintenance of existing water developments for livestock, wildlife and visitor use could continue, subject to compliance with current policies and practices, provided Monument resources were protected.

### Monument Resources

#### IMPACTS ON PALEONTOLOGICAL RESOURCES

The locations of all paleontological resources within the Monument are not known. However, studies show that paleontological resources are prevalent throughout the entire area. Impacts to paleontological resources come from unauthorized collection of fossils, degradation by erosion, vehicles, and trampling by animals and humans. The greater the number of people, animals, and vehicles in an area, the more likely these impacts would occur. It is assumed that an increase in visitation could directly and indirectly affect these resources, as described below.

#### Alternative A (No Action)

Cross-country travel could occur on a large portion of the Monument. The miles of routes designated open for motor vehicle travel is the greatest in this alternative. This alternative would allow visitors to travel to more areas than the other alternatives, which could result in more widespread damage to or illegal collection of fossils.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, picnic areas, pullouts, and restrooms would create surface disturbance. Impacts to paleontological resources from this surface disturbance would be avoided by conducting surveys prior to any ground disturbing activities. If paleontological resources were present, the facility would be relocated, or the paleontological resource would be collected, stabilized, or excavated, or other mitigation measures would be taken prior to construction.

This alternative would allow for the fewest visitor site facilities and trails. It is estimated that 16 sites would be constructed, disturbing about 8 acres.

Completion of the Calf Creek campground would not affect any known paleontological resources. Prior to any ground disturbing activities associated with the completion of

the campground, surveys would be conducted. If paleontological resources were found, impacts would be mitigated.

Population growth, locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument. This would likely add to the impacts of this alternative on paleontological resources.

Research uses in the Monument could have both beneficial and adverse impacts on paleontological resources. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and type of paleontological resources in the Monument, or which result in stabilizing or preserving paleontological resources at risk of being damaged or destroyed. Adverse impacts could result from surface disturbing research activities. Research project design would be required to mitigate adverse impacts to paleontological resources.

Livestock grazing could impact paleontological resources directly by trampling and indirectly through accelerating erosion. In all alternatives, uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on paleontological resources would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

The construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could disturb, damage, or destroy paleontological resources. These impacts could occur primarily through surface disturbing construction, and impacts associated with the subsequent concentration of use in the immediate vicinity of some water developments, such as troughs or impoundments. Impacts to paleontological resources would be avoided through a clearance process which would assure that paleontological resources were not present, or if such resources were present, the development would be moved to a site which would not affect paleontological resources. Maintenance of existing water developments could disturb, damage, or destroy paleontological resources through surface disturbing maintenance activities. Prior to authorizing maintenance activities, a clearance process would be performed, and impacts would be mitigated as appropriate.

In conclusion, paleontological resources could be adversely affected by this alternative

more than in Alternatives B, C, D, and E, as it affords the fewest visitor management options. While this alternative would have the fewest visitor site facilities, impacts that would result from the lack of restrictions on motorized and mechanized cross-country travel, and other uncontrolled visitor use, have a large potential to impact resources. These impacts would increase over time.

### **Alternatives B, C, D, E**

In Alternatives B, C, D, and E, the Monument would be closed to motorized and mechanized cross-country travel. This would afford substantial protection to paleontological resources from the direct effects of cross-country vehicle use, and from the indirect effects (unauthorized collection, erosion) of the increased access to paleontological resources cross-country vehicle use would provide.

Alternatives B, C, D, and E would close portions of the Monument to motorized and mechanized vehicle use on certain routes. This would afford protection of paleontological resources by reducing access to them. Based on the proposed access management and configuration of each alternative, the protection for paleontological resources would be the greatest in Alternative D, followed by Alternatives B, C, and E.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, picnic areas, pullouts, and restrooms would create surface disturbance in all alternatives. The least disturbance would occur in Alternatives C and D, disturbing 10 acres each over 15 years. Alternative B would disturb 16 acres and Alternative E would disturb 22 acres over 15 years. Impacts to paleontological resources from this surface disturbance would be mitigated by conducting surveys prior to any ground disturbing activities. If paleontological resources were present, the facility would be relocated or the paleontological resource would be collected, excavated, or stabilized, or other mitigating measures would be used.

Developed campgrounds and designated primitive campsites would be surveyed for paleontological resources before construction or designation. If any paleontological resources were found, impacts to these resources would be mitigated by either moving the campground or campsite, or by excavation, stabilization, or other measures.

In Alternative E, it is assumed that one developed campground would be built, disturbing 15 acres. No other alternative would allow construction of developed campgrounds. Alternatives C and D could designate 13 primitive campsites, disturbing 26 acres. Alternative B would designate 9

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

primitive campsites, disturbing 18 acres. Alternative E would designate 3 primitive campsites, disturbing 6 acres, in addition to the 15 acres disturbed for a developed campground.

Alternative B would result in the least disturbance from campsite development, with 18 acres disturbed. Alternative E is next with 21 acres, and Alternatives C and D would be most disturbing, at 26 acres each. The net acreage disturbance is not the only indicator of the relative risk to paleontological resources. The type, location, and specifications of the campsites could all influence the actual impacts on resources. All potential campsites would be surveyed prior to construction or designation in order to avoid or mitigate impacts.

In Alternative E, it is estimated that 43 facilities/sites would be provided. Alternative B would provide 32 facilities/sites, and Alternatives C and D would provide 20 facilities/sites each. Subsequent use of these facilities would concentrate visitors in these areas. This could result in impacts to paleontological resources located nearby. These impacts would be mitigated through site selection, design, interpretation, stabilization, excavation, or other measures.

In Alternatives B, C, D, and E, increases in visitation could be controlled through

allocations, even as population and tourism pressures increase. Partial mitigation of the effects of increased tourism would be achieved by allocating the number of visitors in areas with sensitive paleontological resources. Allocations would be most prevalent in Alternatives C and D, where they could be implemented on 1,684,899 acres, followed by Alternative B, where allocations could occur on 1,571,162 acres. In Alternative E, allocation could occur on 1,466,541 acres.

Research uses in the Monument could have both beneficial and adverse impacts on paleontological resources. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and type of paleontological resources in the Monument, or which result in stabilizing or preserving paleontological resources at risk of being damaged or destroyed. Benefits to paleontological resources from research use would most likely occur from Alternatives B and C. Adverse impacts could result from surface disturbing research activities. Research project design would be required to mitigate adverse impacts to paleontological resources.

Livestock grazing could impact paleontological resources directly by trampling, and indirectly through accelerating erosion. In all alternatives, livestock grazing

uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on paleontological resources would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

Alternatives B and C would authorize new water developments only when necessary for the protection of Monument resources. Alternative D would authorize no new water developments, and Alternative E would authorize new water developments for the protection of Monument resources or for management of livestock, wildlife, or visitor use. Disturbance, damage, or destruction of paleontological resources in Alternatives B, C, and E could result from surface disturbing construction and impacts associated with the subsequent concentration of use in the immediate vicinity of some water developments, such as troughs or impoundments. Impacts to paleontological resources in Alternative B, C, and E would be mitigated through a clearance process which would assure that paleontological resources were not present, or when such resources were present, the development would be moved to a site which would not affect paleontological resources. There would be no effects to

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

paleontological resources in Alternative D, since no new water developments would be authorized. Maintenance of existing water developments in Alternative B, C, D and E could disturb, damage, or destroy paleontological resources through surface disturbing maintenance activities. A clearance would be performed prior to the authorization of any maintenance activities, and measures would be taken to mitigate impacts where necessary.

In conclusion, although Alternatives B, C, D, and E may increase some risks of adverse impacts on paleontological resources to varying degrees, all would have a significant net beneficial impact due to the restrictions on access and use and due to mitigation measures. Alternative D, with the fewest miles of routes designated open, would have the least impact from vehicle travel, followed by Alternative B, and then by Alternatives C and E. The adverse impacts of the alternatives also vary according to the amount of surface disturbance and visitor use allowed. Total surface disturbance from construction of visitor facilities, campgrounds, and designated campsites would be greatest in Alternative E, followed by Alternatives C, D, and B. However, the majority of these impacts to paleontological resources would be mitigated.

### IMPACTS ON ARCHAEOLOGICAL AND HISTORIC RESOURCES

The locations of most cultural resource sites within the Monument are not known. Impacts to cultural resources, including both archaeological and historic sites, come from unauthorized collection, vandalism, erosion, trampling, and damage from vehicles driving over resources. The greater the number of people and vehicles in an area, the more likely these impacts are to occur. It is assumed that an increase in visitation could directly and indirectly affect cultural resources. Impacts could result from the activities described below.

#### Alternative A (No Action)

Many areas of the Monument would remain open to motorized and mechanized cross-country travel. On about 15 percent of the Monument, cross-country vehicle use would be limited to existing routes, and about 4 percent would be closed to cross-country vehicle use. This is the least restrictive alternative for these uses. This alternative would allow visitors to travel to more areas, which could result in more cultural resources being destroyed or collected, and more sites being illegally excavated or vandalized.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas,

picnic areas, pullouts, and restrooms would create surface disturbance. Impacts to cultural resources from this surface disturbance would be mitigated by conducting clearances prior to any ground disturbing activities. If cultural resources were found, the facility would be relocated, or the cultural resources would be collected, excavated, or stabilized, or other mitigating measures would be taken. This alternative would allow for the fewest visitor site facilities and trails. It is estimated that 16 sites would be constructed under this alternative, disturbing about 8 acres.

Population growth, locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument, since visitor use is unrestricted in this alternative. This increased visitation would likely increase the adverse impacts of this alternatives on cultural resources, since no allocations or further visitor restrictions would be employed.

Research uses in the Monument could have both beneficial and adverse impacts on archeological and historic resources. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and type of archeological and historic resources in the Monument, or which result in stabilizing or preserving archeological and historic

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

resources at risk of being damaged or destroyed. Adverse impacts could result from surface disturbing research activities. Research project design would be required to mitigate adverse impacts to archeological and historic resources.

Livestock grazing could impact archaeological and historic resources through surface disturbance, erosion, and trampling. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on archeological and historic resources would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

The construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could disturb, damage, or destroy archeological and historic resources. These impacts would occur primarily through surface disturbing construction, and the direct impacts associated with the subsequent concentration of use in the immediate vicinity of some water developments, such as troughs or

impoundments. Impacts to archeological and historic resources would be mitigated through a clearance process which would assure that archeological and historic resources were not present, or if such resources were present, the development would be moved to a site which would not affect archeological and historic resources. Maintenance of existing water developments could disturb, damage, or destroy archeological and historic resources through surface disturbing maintenance activities. A clearance would be performed prior to the authorization of any maintenance activities, and measures would be taken to mitigate impacts to cultural or historic resources where necessary.

In conclusion, cultural and historic resources could be impacted more in this alternative than in Alternatives B, C, D, and E, as it affords the fewest visitor management options. Most of the degrading impacts would result from motorized and mechanized cross-country travel, and from visitor use, which would increase. Uncontrolled over time, the lack of limits on group sizes could also result in degradation of cultural and historic resources.

### **Alternatives B, C, D, E**

In Alternatives B, C, D, and E, the Monument would be closed to motorized and mechanized cross-country travel. This would

afford substantial protection to cultural resources from the direct effects of cross-country vehicle use, and from the effects of the increased access to cultural resources cross-country vehicle use would provide.

Alternatives B, C, D, and E would close portions of the Monument to motorized and mechanized vehicle use on routes. This would afford protection of cultural resources by reducing access to them. This protection would be the greatest in Alternative D, followed by Alternatives B, C, and E.

In Alternatives B, C, D and E, impacts to archaeological resources (particularly rock art and structures with wood parts) from wildfire could occur. Because cross-country travel is prohibited and designated routes vary in Alternatives B, C, D, and E, impacts to cultural or archeological sites could be greater if limited access hindered wildfire suppression activities. Although emergency exceptions for wildfire suppression could be granted, the lack of maintained routes in certain areas and restrictions on the use of some types of equipment could delay or affect response. However, because fire is not a significant risk in most of the Monument, and because the access restrictions do not vary significantly in their impacts on suppression activities, these impacts would be minimal. The limited impacts which could occur would be more than offset by the protection that

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

archaeological resources would receive from trampling, disturbance, or unauthorized collection associated with motorized cross-country travel and access.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, pullouts, and restrooms would create surface disturbance. Impacts to cultural resources from surface disturbance would be mitigated by conducting clearances prior to any ground disturbing activity. If cultural resources were found, the facility would be relocated, or mitigation measures, such as collection or stabilization, would be used. The least disturbance would occur in Alternatives C and D, each disturbing 10 acres over 15 years. Alternative B would disturb 16 acres, and Alternative E would disturb 22 acres over 15 years.

Developed campgrounds and designated primitive campsites would be surveyed for cultural resources before construction or designation. If resources were found, impacts would be mitigated by relocating the facility, if possible, or mitigation measures, such as collection or stabilization, would be used. In Alternative E, it is assumed that one developed campground would be built, disturbing 15 acres. No other alternatives would allow construction of developed campgrounds. Alternatives C and D could designate 13 primitive campsites, disturbing

26 acres. Alternative B would designate 9 primitive campsites, disturbing 18 acres. Alternative E could designate 3 primitive campsites, disturbing 6 acres.

In Alternative E, it is estimated that 43 visitor site facilities would be provided. Alternative B would provide 32 facilities/sites, and Alternatives C and D would provide 20 facilities/sites each. Subsequent use of these facilities would concentrate visitors in these areas. This could result in impacts to cultural resources located near the facilities. These impacts could be mitigated or prevented through site selection and design, collection, excavation, stabilization, or other measures.

In Alternatives B, C, D, and E, increases in visitation could be controlled, and impacts to cultural resources partially mitigated, through visitor allocations, even as population and tourism pressures increase. Allocations would be most prevalent in Alternatives C and D, where allocations could be implemented on 1,684,899 acres, followed closely by Alternative B, where allocations could occur on 1,571,162 acres. In Alternative E, allocations could occur on 1,466,541 acres.

Research uses in the Monument could have both beneficial and adverse impacts on archeological and historic resources. Beneficial impacts could result from research

activities which focus on increasing the knowledge of the distribution and type of archeological and historic resources in the Monument. They could also result in stabilizing or preserving archeological and historic resources at risk of being damaged or destroyed. Benefits to archeological resources from research use would most likely occur from Alternatives B and C. Alternatives D and E would also promote research uses, but with more limitations. Adverse impacts could result from surface disturbing research activities. Research project design would be required to mitigate adverse impacts to archeological and historic resources.

Livestock grazing could impact archeological and historic resources by surface disturbance, trampling, and erosion. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on cultural and historic resources would be assessed, and if adverse impacts were found, adaptive management measures, such as fencing and alternative livestock rotation schedules, could be implemented.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

Alternatives B and C would authorize new water developments only when necessary for the protection of Monument resources. Alternative D would authorize no new water developments. Alternative E would authorize new water developments for the protection of Monument resources, or for the management of livestock, wildlife, or visitor use. Disturbance, damage, or destruction of archeological and historic resources could occur in Alternatives B, C, and E from surface disturbing construction, and impacts associated with the subsequent concentration of use in the immediate vicinity of some water development, such as troughs or impoundments. Impacts to archeological and historic resources in Alternative B, C, and E would be mitigated through a clearance process which would assure that archeological and historic resources were not present, or if such resources were present, the development would be moved to a site which would not affect archeological and historic resources. There would be no impacts to archeological and historic resources in Alternative D, since no new water developments would be authorized. Maintenance of existing water developments in Alternatives B, C, D and E could disturb, damage, or destroy archeological and historic resources through surface disturbing maintenance activities. A clearance would be performed prior to the authorization of any maintenance activities, and measures would

be taken to mitigate impacts to cultural or historic resources.

In conclusion, although Alternatives B, C, D, and E may increase some risks of adverse impacts on archeological and historic resources to varying degrees, all would have a significant net beneficial impact due to the restrictions on access and use and due to mitigation. Alternative D, with the fewest miles of routes designated open, would have the least impact from vehicle travel, followed closely by Alternative B, and then by Alternatives C and E. The adverse impacts of the alternatives also vary according to the amount of surface disturbance and visitor use allowed. Total surface disturbance from construction of visitor facilities, campgrounds, and designated campsites would be greatest in Alternative E, followed by Alternatives C, D, and B. However, the vast majority of these impacts to archaeological and historic resources would be mitigated as discussed above.

### IMPACTS ON VEGETATION

Vegetation is a fundamental and vitally important element among the Monument's biological resources. Impacts to vegetation would result in impacts to other resources. Where impacts to vegetation lead to soil erosion, that erosion could adversely impact archeological, paleontological, and historic

resources, as well as water quality and air quality. Impacts which lead to changes in the composition of vegetative associations, brought about by invasion of weeds, surface disturbance, or other factors, could impact other plant and animal communities.

Direct impacts to vegetation are caused by surface disturbance from recreational and other uses. Impacts include trampling of vegetation, degradation and loss of habitat, and introduction and spread of noxious weeds and non-native plants. These impacts come from the activities described below.

### Alternative A (No Action)

Cross-country vehicle travel could occur on a large portion of the Monument. Access on routes is also the greatest in this alternative. Surface disturbance from vehicle travel, and from the increased visitation attributable to access, would impact vegetation.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, picnic areas, pullouts, and restrooms would create surface disturbance. This alternative would allow fewer facilities than the other alternatives, with an estimated 16 sites, disturbing about 8 acres. Impacts to vegetation would be minimized through careful site selection and design, and visitor sites would not be located in sensitive areas.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

Population growth locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument. No allocations or group size limits are planned in this alternative.

Research uses in the Monument could have both beneficial and adverse impacts on vegetation. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and type of vegetation in the Monument. They could also result from stabilization or preservation of vegetation at risk of being damaged or destroyed. Adverse impacts could result from surface disturbing research activities. Research project design would be required to mitigate adverse impacts to vegetation.

Livestock grazing impacts vegetation through ground disturbance, trampling, and removal of plants, and by altering the composition of vegetative associations. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on vegetation would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

The construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could disturb, damage, or destroy vegetation. These impacts would occur primarily through surface disturbing construction, and impacts associated with the subsequent concentration of use in the immediate vicinity of some water developments, such as troughs or impoundments. Impacts to vegetation would be mitigated through a clearance process which would assure that sensitive vegetation resources were not present, or when such resources were present, the development would be moved to a site which would not affect vegetation. Maintenance of existing water developments could disturb, damage, or destroy vegetation through surface disturbing maintenance activities. A clearance would be performed prior to the authorization of any maintenance activities, and measures would be taken to mitigate impacts to vegetation.

In conclusion, impacts to vegetation by actions in this alternative would be greater than in Alternatives B, C, D, and E, primarily because of lacks of restrictions on cross-country vehicle use, and because of having the fewest provisions for controlling visitor use and impacts.

### **Alternatives B, C, D, E**

In Alternatives B, C, D, and E, the Monument would be closed to motorized and mechanized cross-country travel. This would afford substantial protection to vegetation from the impacts of cross-country vehicle use.

Alternatives B, C, D, and E would close portions of the Monument to motorized and mechanized vehicle use on routes. This would afford protection of vegetation by reducing access and the resultant impacts, and by reducing the potential for spread of noxious weeds and non-native plants associated with vehicle travel. This protection would be greatest in Alternative D (760 miles of open routes), followed by Alternative B (818 miles of open routes), and then by C (1,187 miles of open routes) and E (1,264 miles of open routes).

Because cross-country travel would be prohibited, and the number of routes designated for motorized access would vary in Alternatives B, C, D, and E, wildfire suppression activities could be limited. While emergency exceptions for wildfire suppression could be granted, the lack of maintained routes in certain areas, and restrictions on the use of some types of equipment, could limit response. However, because fire is not a significant risk in most of the Monument, and because the access

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

restrictions do not vary significantly in their impacts on suppression activities, these impacts are expected to be minimal.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, picnic areas, pullouts, campgrounds, restrooms, and the designation of campsites would create surface disturbance in all alternatives. The least disturbance would occur in Alternative B, disturbing 34 acres, followed by Alternatives C and D, disturbing 36 acres each, and Alternative E, disturbing 43 acres.

In Alternatives B, C, D, and E, the impacts of increases in visitation could be mitigated through allocations to protect vegetation from the impacts of visitor use, even as population and tourism pressures increase. Allocations would be most frequently employed in Alternatives C and D, where allocations could be implemented on 1,684,899 acres. This is followed by Alternative B, where allocations could occur on 1,571,162 acres. In Alternative E, allocations could occur on 1,466,541 acres.

Research uses in the Monument could have both beneficial and adverse impacts on vegetation. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and type of vegetation in the Monument, or

which result in a better understanding of plant communities and their environment. Benefits to vegetation from research use would most likely occur from Alternatives B and C. Adverse impacts could result from surface disturbing research activities or activities which remove or damage vegetation. Research project design would be required to mitigate adverse impacts to vegetation.

Livestock grazing impacts vegetation through ground disturbance, trampling, and removal of plants, and by altering the composition of vegetative associations. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on vegetation would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

Alternatives B and C would authorize new water developments only when necessary for the protection of Monument resources. Alternative D would authorize no new water developments. Alternative E would authorize new water developments for the protection of Monument resources, or for the management of livestock, wildlife, or visitor use. The disturbance, damage, or destruction of

vegetation in Alternatives B, C, and E could result from surface disturbing construction, and impacts associated with the subsequent concentration of use in the immediate vicinity of some water developments, such as troughs or impoundments. Impacts to vegetation in Alternative B, C, and E would be mitigated through a clearance process which would assure that sensitive vegetation was not present, or if such resources were present, the development would be moved to a site which would not affect vegetation. There would be no impacts to vegetation in Alternative D, since no new water developments would be authorized. Maintenance of existing water developments in Alternative B, C, D and E could disturb, damage, or destroy vegetation through surface disturbing maintenance activities. A clearance would be performed prior to the authorization of any maintenance activities, and measures would be taken to mitigate impacts to vegetation.

In conclusion, although Alternatives B, C, D, and E may increase some risks of adverse impacts to vegetation to varying degrees, all would have a significant net beneficial impact from restrictions on access, use, and due to mitigation. Alternative D, with the fewest miles of routes designated open, would have the least impact from vehicle travel, followed by Alternative B, and then by Alternatives C and E. The adverse impacts of the alternatives also vary according to the amount

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

of surface disturbance and visitor use allowed. Total surface disturbance from construction of visitor facilities, campgrounds, and designated campsites would be greatest in Alternative E, followed by Alternatives C, D, and B. However, the majority of these impacts to vegetation would be mitigated as discussed above.

### IMPACTS ON THREATENED AND ENDANGERED PLANT SPECIES

Three threatened and endangered plant species occur within the Monument. Direct and indirect impacts to these plants and their habitat could be caused by surface disturbance, livestock grazing, and visitor use. Impacts include mortality of plants, trampling of vegetation, compaction of soil, casual collection of plants, degradation and loss of habitat, and introduction and spread of noxious weeds and non-native plants. These impacts could result in declines in threatened and endangered plant population numbers and decreased population viability over time. Adverse impacts on threatened and endangered plants could adversely affect other plant or animal species associated with them.

#### Alternative A (No Action)

In this alternative 1,691 acres of known Jones' cycladenia (*Cycladenia humilis* var.

*jonesii*) populations and habitat and 2,851 acres of Kodachrome bladderpod (*Lesquerella tumulosa*) populations and habitat would be in areas open to cross-country vehicle travel. Current and projected increases in cross-country vehicle travel could impact these populations. Ute ladies'-tresses (*Spiranthes diluvialis*) populations and habitat (64 acres) occur in areas that would remain closed to cross-country vehicle travel, and would not be impacted by current or increased use.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, pullouts, and restrooms create surface disturbance and increased use in adjacent areas. These surface disturbing activities would not be allowed in threatened and endangered plant populations or habitat without proper mitigation and consultation. Prior to any construction of facilities in the Monument, a survey would be required to determine the presence of listed species. These restrictions would protect 4,606 acres of known threatened and endangered plant habitat, and any new populations found in surveyed areas.

Currently, there are no visitor facilities present in 4,542 acres of known Kodachrome bladderpod and Jones' cycladenia populations and habitat. Increases in use at existing visitor site facilities would most likely have

no direct or indirect impact on Kodachrome bladderpod or Jones' Cycladenia populations or habitat. Trails, campgrounds and trailheads occur within the 64 acres of known Ute ladies'-tresses habitat. Current and projected increases of day-use could impact Ute ladies'-tresses populations and habitat in this alternative.

Completion of Calf Creek campground and use of designated primitive campsites would have no effect on known threatened and endangered plants, since the facilities are not located near the known plant populations or habitat.

The projected increases in population growth, locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument, since visitor use is unrestricted in this alternative. This increased visitation could also increase the impacts of visitation on threatened and endangered plant species.

Research uses in the Monument could have beneficial impacts on threatened and endangered plant species. Beneficial impacts could result from research activities which focus on increasing knowledge of threatened and endangered plant species in the Monument, or which result in stabilizing or preserving threatened and endangered plant species. Direct or indirect adverse impacts to

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

threatened and endangered plants in the Monument which could result from surface disturbing research activities would be mitigated. The activity could also be modified to avoid areas with threatened or endangered plants, or the research activity would not be permitted.

Currently, all known populations of threatened and endangered plants are subject to livestock grazing. Kodachrome bladderpod populations occur on barren sites, and Jones' cycladenia populations occur in barren sites, which do not tend to be heavily grazed. There are no known impacts from livestock grazing on those populations. Populations of Ute Ladies'-tresses occur in a riparian area immediately adjacent to an established visitor site. There are no known impacts from livestock grazing on that population. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on threatened and endangered plants would be assessed, and if adverse impacts were found, adaptive management measures would be implemented.

In conclusion, this alternative could cause impacts to Kodachrome bladderpod, Jones' cycladenia, and Ute ladies'-tresses populations and habitat. Impacts to 1,691 acres of known Jones' cycladenia populations and habitat and 2,851 acres of Kodachrome bladderpod populations and habitat could occur from cross-country vehicle travel. Impacts could also occur in unknown populations. There could be impacts to Kodachrome bladderpod and Jones' cycladenia from increased visitor use, if that use resulted in increased ATV use or trampling. Ute ladies'-tresses populations and habitat (64 acres) would remain in areas closed to cross-country vehicle travel.

### **Alternatives B, C, D, E**

In Alternatives B, C, D, and E, the Monument would be closed to motorized and mechanized cross-country travel. This would afford substantial protection to known and unknown threatened and endangered plant populations and their habitat. This protection would be from both the direct and indirect effects of cross-country vehicle use, and from the effects of the increased access to the populations and their habitat that cross-country vehicle use would provide. These restrictions would help protect 4,606 acres of known threatened and endangered plant populations, and acres of unknown

populations and their habitat, from unregulated use.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, pullouts, and restrooms would not be allowed in threatened and endangered plant populations in Alternatives B, C, D, and E. Any construction of facilities in the Monument would require surveys prior to construction to determine the presence of the species. These restrictions would protect 4,606 acres of known threatened and endangered plant populations, as well as any populations found during surveys.

None of the proposed developed campgrounds or primitive campsites would be constructed or designated in known threatened and endangered plant populations in Alternatives B, C, D, or E. Any construction of facilities in the Monument would require surveys prior to construction to determine the presence of the species. Campgrounds would not be allowed where they would impact threatened and endangered species.

Trails, campgrounds, and trailheads occur within the 64 acres of known Ute ladies'-

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

tresses habitat. Groups size limits and allocations are proposed in Alternatives B, C, D, and E. Restrictions on use could prevent impacts to 64 acres of known Ute ladies'-tresses populations and habitat. Construction of new trails, interpretive signs, and barriers could be used to redirect use and prevent impacts to Ute ladies'-tresses populations and habitat.

Alternatives B, C, D, and E allow allocations, which could be used to control visitation and mitigate impacts from increased visitation as population and tourism pressures increase. This would help protect threatened and endangered plant species. Allocations would be most widespread in Alternatives C and D, where allocations could be implemented on 1,684,899 acres, followed by Alternative B, where allocations could occur on 1,571,162 acres. In Alternative E, allocations could occur on 1,466,541 acres.

Research uses in the Monument could have beneficial effects on threatened and endangered plant species. Beneficial impacts could result from research activities which focus on increasing knowledge of the distribution and type of threatened and endangered plant species in the Monument or which result in stabilizing or preserving threatened and endangered plant species. Surface disturbing research activities would avoid areas with threatened or endangered

plants, or the research activity would not be permitted.

Currently, all known populations of threatened and endangered plants are subject to livestock grazing. Kodachrome bladderpod populations occur on barren sites, and Jones' cycladenia populations occur in barren, high elevation sites, which do not tend to be heavily grazed. There are no known impacts from livestock grazing on those populations. Populations of Ute Ladies'-tresses occur in a riparian area immediately adjacent to an established visitor site. There are no known impacts from livestock grazing on that population. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on threatened and endangered plants would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

In conclusion, Alternatives B, C, D, and E would have beneficial effects on Kodachrome bladderpod and Jones' cycladenia populations because of restrictions on vehicle use. Potential impacts to Ute ladies'-tresses populations and habitat by visitation increases would be mitigated by interpretation, trail construction, and if necessary, physical barriers.

### IMPACTS ON RELICT VEGETATION

Relict plant communities exist in areas that have been and continue to be inaccessible to livestock grazing and to motorized and mechanized vehicle travel. Direct and indirect impacts to these areas are caused by surface disturbance and visitor use. Impacts include trampling of vegetation, degradation and loss of habitat, and introduction and spread of noxious weeds and non-native plants. Relict plant communities may support relict species of insects, invertebrates, and vertebrate animals. Impacts to relict plant communities could affect those associated organisms as well. These impacts come from the activities described below.

#### Alternative A (No Action)

Of the 12,986 acres of known relict plant communities, 5,513 acres are in areas designated open to motorized and mechanized travel. Use by cross-country vehicles in these areas does not currently occur due to inaccessibility. There are 258 acres of known relict plant communities in areas closed to motorized and mechanized use.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, pullouts, and restrooms create surface disturbance. These surface disturbing

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

activities would not be allowed in relict plant communities.

Completion of Calf Creek campground and use of designated primitive campsites would have no effect on relict plant communities, since the facilities are not located near these communities.

Impacts from increased use in areas adjacent to relict plant communities may occur as a result of facility development, and as a result of projected increases in population and tourism.

Visitation from large groups could adversely impact relict plant communities. No group size restrictions or visitor allocations are proposed for this alternative. This could result in direct impacts which would increase as visitation increases.

Research uses in the Monument could have both beneficial and adverse impacts on relict vegetation. Beneficial impacts could result from research activities which focus on increasing the knowledge of the relict vegetation areas in the Monument or which result in stabilizing or preserving relict vegetation areas. Direct or indirect adverse impacts to relict vegetation in the Monument, which could result from surface disturbing research activities, would be mitigated by

modifying the research activity to avoid the impact or by prohibiting the research activity. In conclusion, this alternative could cause impacts to relict plant communities. Impacts include trampling of vegetation, degradation and loss of habitat, and introduction and spread of noxious weeds and non-native plants through human or animal foot traffic. Unrestricted use by visitors also has the potential to impact relict plant communities.

### **Alternatives B, C, D, E**

In Alternatives B, C, D and E, the Monument would be closed to motorized and mechanized cross-country travel. These restrictions would help protect known and unknown relict plant communities by reducing access to these areas.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, pullouts, and restrooms create surface disturbance. These activities would not be allowed in relict plant communities in Alternative B, C, D, or E.

None of the proposed developed campgrounds or primitive campsites would be constructed or designated in known relict plant communities in Alternatives B, C, D, or E. Any construction of facilities in the Monument would require surveys prior to construction to determine proximity to relict plant communities, and if direct or indirect impacts to relict plant

communities were determined to be possible, these impacts would be mitigated or the campground or primitive campsite would be moved.

Alternatives B, C, D, and E allow allocations, which could be used to control visitation and mitigate the impacts of increased visitation as population and tourism pressures increase. This would help protect relict plant communities. Allocations would be most widespread in Alternatives C and D, where allocations could be implemented on 1,684,899 acres, followed closely by Alternative B, where allocations could occur on 1,571,162 acres. In Alternative E, allocations could occur on 1,466,541 acres.

Research uses in the Monument could have both beneficial and adverse impacts on relict vegetation. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and type of relict vegetation areas in the Monument, or which result in stabilizing or preserving relict vegetation areas. Direct or indirect adverse impacts to relict vegetation in the Monument, which could result from surface disturbing research activities, would be completely mitigated or modified to avoid relict vegetation areas, or the research activity would not be permitted.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

In conclusion, Alternatives B, C, D, and E would have significant net beneficial impacts due to the restrictions on access and use, and from mitigation. Alternative D, with the fewest miles of routes designated open, would have the least impact from vehicle travel, followed closely by Alternative B, and then by Alternatives C and E.

### IMPACTS ON RIPARIAN RESOURCES

Riparian areas, though they total less than one percent of all lands in the Monument, are among the most productive and ecologically valuable resources. Riparian resources are affected by trampling and removal of natural vegetation or other surface disturbance, which could cause bank disturbance and destabilization, increased erosion and siltation, disruption to riparian dependent plants and wildlife, and degradation of water quality.

#### Alternative A (No Action)

Many areas of the Monument would remain open to cross-country vehicle travel under this alternative, including some riparian habitat. Increases in cross-country vehicle use would increase impacts to these resources.

Construction of visitor site facilities, such as trailheads, interpretive sites, parking areas,

pullouts, campgrounds, and restrooms, create surface disturbance. These surface disturbing activities would not be allowed to affect riparian areas.

No group size restrictions or allocations on backpacking, hiking, and use of pack animals are proposed to be established in this alternative. Unrestricted use in riparian areas, some of the most heavily used currently, could result in direct impacts to these areas. Impacts would potentially be greatest for the Escalante Canyons, due to its popularity.

Research uses in the Monument could have both beneficial and adverse impacts on riparian resources. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and type of riparian resources in the Monument, or which result in stabilizing or preserving riparian resources at risk of being damaged or destroyed. Adverse impacts could result from surface disturbing research activities. Research project design would be required to mitigate adverse impacts to riparian resources.

Livestock grazing could impact riparian resources through surface disturbance, streambank disturbance, removal of vegetation, water quality degradation, increased erosion and siltation, trampling, and the alteration of the composition of vegetative associations. In all alternatives, livestock grazing uses within the

Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on riparian resources would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

The construction of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could have both beneficial and adverse effects on riparian resources. Benefits could occur if water developments were used to move livestock away from riparian resources. Adverse impacts could occur if a significant amount of water were piped away from the source, resulting in reduced flow rates or dewatering. Impoundments could have an adverse impact by retaining water which would otherwise flow downstream. Adverse impacts to riparian resources from water development would be prevented through design, or the water development would not be authorized.

In conclusion, in this alternative, impacts would continue to occur to riparian resources. These impacts would be expected to increase as use increases.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

### Alternatives B, C, D, E

In Alternatives B, C, D, and E, the Monument would be closed to motorized and mechanized cross-country travel, affording substantial protection to riparian resources. This protection would be from both the direct and indirect effects of cross-country vehicle use, and from the effects of the increased access to the riparian areas that cross-country vehicle use would provide.

Alternatives B, C, D, and E would close portions of the Monument to motorized and mechanized vehicle use on routes. This would afford protection of riparian resources by reducing access and resultant impacts. This protection would be greatest in Alternative D, with 760 miles of routes designated open, followed by Alternative B, with 818 miles of routes designated open. Alternative C would provide 1,187 miles of routes designated open, and Alternative E would provide 1,264 miles.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, pullouts, and restrooms create surface disturbance. The greater the number of facilities proposed in riparian areas, the greater the potential impacts to riparian habitat. None of the 16 - 22 acres of proposed disturbance in Alternatives B, C, D, or E would directly impact riparian habitat.

Developed campgrounds and designated primitive campsites would not directly affect riparian habitat. Prior to any designation, these areas would be evaluated for impacts to riparian resources. Riparian habitat would be avoided in the location of campgrounds or campsites.

Subsequent use of visitor site facilities would concentrate visitors. This could result in impacts to riparian areas around facilities. For example, there would be increased risks of the spread of weeds due to vehicular and human or animal foot traffic. Projected increases in use in areas of existing and new facilities would increase impacts to riparian habitat in the vicinity of these facilities. Potential indirect impacts from visitor use in adjacent areas would be greatest in Alternative E because the greatest number of sites would be made available for visitor use, followed by Alternative B.

Alternatives B, C, D, and E would allow allocations to control visitation as population and tourism pressures increase. This would help protect riparian resources. Visitor allocations would be most widespread in Alternatives C and D, where allocations could be implemented on 1,684,899 acres, followed by Alternative B, where allocations could occur on 1,571,162 acres. In Alternative E, allocations could occur on 1,466,541 acres.

Research uses in the Monument could have both beneficial and adverse impacts on riparian

resources. Beneficial impacts could result from research activities which focus on increasing knowledge of the distribution and type of riparian resources in the Monument, or which result in a better understanding of riparian areas. Benefits to riparian resources from research use would most likely occur from Alternatives B and C. Alternatives D and E, which also promote research uses, but with more limitations, would follow. Adverse impacts could result from surface disturbing research activities or activities which remove or damage riparian resources. Research project design would be required to mitigate adverse impacts to riparian resources.

Livestock grazing could impact riparian resources through surface disturbance, streambank disturbance, removal of vegetation, water quality degradation, increased erosion and siltation, trampling, and the alteration of the composition of vegetative associations. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on riparian resources would be assessed, and if

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

adverse impacts were found, adaptive management measures could be implemented.

Alternatives B and C would allow construction of new water developments only when such developments protect Monument resources. Alternative E would allow the construction of new water developments for the management of livestock, wildlife, or visitor use, as well as to protect Monument resources. In Alternatives B, C and E, the construction of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could have both beneficial and adverse effects on riparian resources. Beneficial effects could occur if new water developments move livestock away from springs and streams, decreasing erosion, water quality degradation, and other problems associated with livestock. Alternative D would not allow the construction of water developments.

Adverse impacts from water development could occur if a significant amount of water were piped away from the source, resulting in reduced flow rates or dewatering, and subsequent water quality impacts. Impoundments could have an adverse impact by retaining water which would otherwise flow downstream. Adverse impacts would be avoided by the design of the water developments before water developments would be authorized.

In conclusion, although Alternatives B, C, D, and E may increase some risks of adverse impacts on riparian resources to varying degrees, all would have a significant net beneficial impact due to the restrictions on access and use and due to mitigation. Alternative D, with the fewest miles of routes designated open, would have the least impact from vehicle travel, followed closely by Alternative B, and then by Alternatives C and E.

### IMPACTS OF WEEDS

Non-native plants and noxious weeds displace native species and affect the structure of plant associations. These species are spread by a variety of means, some of which (e.g., vehicles and foot traffic) are directly attributable to human actions. Once established in disturbed sites, weeds may spread into adjacent undisturbed lands and disrupt natural plant and animal associations. Direct and indirect impacts from weeds are a result of surface disturbance and visitor use. Impacts include displacement of native vegetation, loss of biodiversity and habitat for animals, degradation of surface water quality, and loss of surface water quantity. These impacts come from the activities described below.

### Alternative A (No Action)

This alternative would have the greatest potential for the spread of weeds within the Monument. Many areas of the Monument would remain open to unregulated cross-country vehicle travel. This could serve as a source of dispersment for seeds and could cause surface disturbance, and increase the risk that weed species could spread into previously unaffected areas.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, and restrooms create surface disturbance. Construction of visitor site facilities, disturbing 8 acres, could facilitate the introduction of weeds. Prior to allowing any construction, areas would be surveyed for weeds, and appropriate mitigation measures would be required to prevent their spread.

Completion of Calf Creek campground could introduce weeds into this habitat. Increased recreational use in 21 designated primitive areas would increase the potential for spread of weeds in these areas. Lack of designated campgrounds, and increases in unregulated and dispersed camping with no group size limitations, could also increase the spread of weeds.

Population growth, locally and nationally, and the growth of tourism regionally, would

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

increase the numbers of people visiting the Monument, since visitor use is unrestricted in this alternative. This increased visitation would also increase the adverse impacts of weeds.

Research uses in the Monument could diminish or expand the impacts of weeds. Research focused on weeds, their distribution in the Monument, their effect on plant communities, or the effect of weeds on other Monument resources, would help to diminish the impacts of weeds by increasing our knowledge of them. Research activities which involve surface disturbing activities could encourage the establishment of weeds in the disturbed areas. Research project design would be required to mitigate adverse impacts of weeds.

Livestock grazing could increase weed dispersal through surface disturbance, removal of vegetation, alteration of the composition of vegetative associations, disturbance of cryptobiotic soils, and transportation of weed seeds. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on the introduction and

spread of weeds would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

This alternative allows new water developments to protect Monument resources, and allows maintenance of existing developments, provided Monument resources are protected.

The construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could create disturbance that would lead to the spread of weeds, or the introduction of weeds into new areas. These impacts would occur primarily through surface disturbing construction, and impacts associated with the subsequent concentration of use in the immediate vicinity of some water development, such as troughs or impoundments. Impacts from weeds would be mitigated through surveys, conducted prior to authorizing water development, to detect the presence of weeds, and through a monitoring program, subsequent to development, to detect the establishment of weeds. Appropriate mitigation to prevent the establishment and spread of weeds would be required. Maintenance of existing water developments could cause disturbance that would lead to the spread of weeds through surface disturbing maintenance activities. Mitigation of maintenance impacts from weeds would be achieved by monitoring to detect

weeds in disturbed areas caused by water development maintenance, and eradication of weeds to prevent them from spreading.

In conclusion, this alternative affords the most unregulated use throughout the Monument. Unregulated uses, such as cross-country vehicle use, camping, and construction activities, would be likely to increase the establishment and spread of weeds.

### **Alternatives B, C, D, E**

In Alternatives B, C, D, and E, the Monument would be closed to motorized and mechanized cross-country travel, affording substantial protection against the spread of weeds. This protection would be from both the direct and indirect effects of cross-country vehicle use, and from the effects of the increased access that cross-country vehicle use would provide.

Alternatives B, C, D, and E would close portions of the Monument to motorized and mechanized vehicle use on routes. This would afford protection from the spread of weeds by reducing access and resultant impacts. This protection would be greatest in Alternative D, with 760 miles of routes designated open, followed by Alternative B,

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

with 818 miles of routes designated open. Alternative C would provide 1,187 miles of routes designated open, and Alternative E would provide 1,264 miles.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, and restrooms would create surface disturbance in Alternatives B, C, D, and E. The greater the number of facilities proposed, the greater the potential for the spread of weeds. The greatest amount of disturbance would occur in Alternative E (22 acres over 15 years), followed by Alternative B (16 acres), Alternative C (10 acres), and Alternative D (10 acres). Prior to allowing any construction, areas would be surveyed for weeds, and appropriate mitigation measures would be required to prevent their spread and establishment.

Developed campgrounds and designated primitive campsites would affect the spread of weeds. The greater the size of the campground or the greater the number of designated campsites, the greater the potential for spread of weeds. In Alternative E, it is assumed that one developed campground would be built, disturbing 15 acres. No other alternatives would allow construction of new developed campgrounds. Alternatives C and D could designate 13 primitive campsites, disturbing 26 acres in each alternative. Alternative B would designate 9 primitive

campsites, disturbing 18 acres. Alternative E would designate 3 primitive campsites, disturbing 6 acres, for a total of 21 acres disturbed in Alternative E. Prior to any designation, these areas would be evaluated for the presence, potential establishment, and spread of weeds. Steps would be taken to mitigate these impacts by relocating the facility and/or taking steps to ensure that weeds would not be established or spread.

Group size and allocations established to limit the number of people in specific areas are proposed for Alternatives B, C, D, and E. These limitations would partially mitigate the impacts of visitation by large groups and reduce the potential for spread of weeds into previously unaffected areas. Impacts would be the same in nature and would vary slightly in magnitude across Alternatives B, C, D, and E.

Research uses in the Monument could diminish or expand the impacts of weeds. Research focused on weeds, their distribution in the Monument, their effect on plant communities, or the effect of weeds on other Monument resources, would help to diminish the impacts of weeds by increasing our knowledge base. Benefits from research would most likely occur from Alternatives B and C. Alternatives D and E also promote research uses, but with more limitations. Research activities that involve surface disturbing activities could encourage the establishment of weeds in the disturbed

areas. Research project design would be required to mitigate adverse impacts of weeds.

Livestock grazing could increase weed dispersal through surface disturbance, removal of vegetation, alteration of the composition of vegetative associations, disturbance of cryptobiotic soils, and transportation of weed seeds. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on the introduction and spread of weeds would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

Alternatives B and C would authorize new water developments when necessary for the protection of Monument resources. Alternative D would authorize no new water developments. Alternative E would authorize new water developments for the protection of Monument resources, or for the management of livestock, wildlife, or visitor use. In Alternatives B, C, and E, the establishment and spread of weeds could result from surface disturbing construction, and impacts associated with the subsequent concentration

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

of use in the immediate vicinity of some water developments, such as troughs or impoundments. Impacts from the establishment of weeds due to water developments in Alternative B, C, and E would be mitigated through monitoring to detect the establishment of weeds, and through the eradication of weeds detected. There would be no effects from weed establishment due to water development in Alternative D, since no new water developments would be authorized. Maintenance of existing water developments could cause disturbance, which would lead to the spread of weeds through surface disturbing maintenance activities. Mitigation of maintenance impacts would be achieved by monitoring to detect weeds and eradicating them.

In conclusion, none of Alternatives B, C, D, or E would be likely to contribute significantly to the spread of weeds, especially relative to the No Action Alternative. All alternatives would reduce the potential for weed dispersion throughout large areas of the Monument by closing them to cross-country vehicle travel. Total surface disturbance from construction of visitor facilities, campgrounds, and designated campsites which could introduce or spread weeds would be greatest in Alternative E, followed by Alternatives C, D, and B.

### IMPACTS ON CRYPTOBOTIC SOILS

Cryptobiotic soils perform many important ecological functions including preventing soil erosion, fixing atmospheric nitrogen, improving plant soil-water relationships, contributing to nutrient cycling, and providing sites for seed germination and plant growth. These soils are particularly sensitive to ground disturbance, especially compression that could result from foot traffic by animals or humans. It is probable that adverse impacts to cryptobiotic soils have adverse impacts on many other resources and environmental factors, including soils, water quality, nutrient cycling, and on vegetation and the other organisms it supports. The location and distribution of cryptobiotic soils in the Monument are not well known. Impacts to cryptobiotic soils come from all soil disturbing activities. These impacts come from the activities described below.

#### Alternative A (No Action)

This alternative would allow the greatest potential for disturbance of cryptobiotic soils from cross-country vehicle travel. Travel on existing travel routes would not impact cryptobiotic soils because they are assumed not to be present in these disturbed areas.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas,

pullouts, and restrooms creates surface disturbance. Construction of visitor site facilities totaling 8 acres could impact cryptobiotic soils in areas previously unaffected. Prior to allowing any construction, areas would be surveyed for cryptobiotic soils, and mitigation measures would be required. Areas containing cryptobiotic soils would be avoided as much as possible in the placement of these facilities.

Completion of Calf Creek campground and continued use of designated primitive campsites would have no additional effect on cryptobiotic soils since these sites are already established and disturbed.

No group size restrictions or allocations are proposed in this alternative. Unrestricted use in areas of cryptobiotic soils could result in direct impacts.

Research uses in the Monument could have both beneficial and adverse impacts on cryptobiotic soils. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and nature of cryptobiotic soils in the Monument, or which result in stabilizing or preserving cryptobiotic soils. Adverse impacts could result from surface disturbing research activities. Research project design would be required to mitigate adverse impacts to cryptobiotic soils.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

Livestock grazing impacts cryptobiotic soils by trampling. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on cryptobiotic soils would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

This alternative would allow new water developments when necessary for the protection of Monument resources. The construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could disturb, damage, or destroy cryptobiotic soils. These impacts would occur primarily through surface disturbing construction, and the direct impacts associated with the subsequent concentration of use in the immediate vicinity of some water developments, such as troughs or impoundments. Impacts to cryptobiotic soils would be mitigated through a clearance process that would identify and avoid cryptobiotic soils in the locations of new water developments. Maintenance of existing water developments could disturb, damage, or destroy cryptobiotic soils through surface disturbing maintenance activities. A

clearance would be performed prior to the authorization of any maintenance activities, and measures would be taken to mitigate impacts to cryptobiotic soils.

In conclusion, impacts to cryptobiotic soils would occur in this alternative. These impacts would come from unregulated cross-country vehicle use, and lack of visitor allocations or restrictions on group size, combined with increased visitation.

### **Alternatives B, C, D, E**

In Alternatives B, C, D, and E, the Monument would be closed to cross-country vehicles. This would benefit cryptobiotic soils. It is assumed that cryptobiotic soils are not present on designated travel routes.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, pullouts, and restrooms would create surface disturbance. The greater the number of facilities proposed, the greater the potential impacts to cryptobiotic soils. The greatest disturbance would occur in Alternative E (22 acres), followed by Alternative B (16 acres), Alternative C (10 acres), and Alternative D (10 acres). Prior to allowing any construction, areas would be surveyed for cryptobiotic soils, and mitigation measures would be required to avoid impacts to areas with cryptobiotic soils.

Developed campgrounds and designated primitive campsites could impact cryptobiotic soils. The greater the size of the campground or the greater the number of designated campsites, the greater the potential impact to cryptobiotic soils. In Alternative E, it is assumed that one developed campground would be built, disturbing 15 acres. No other Alternatives would allow construction of developed campgrounds. Alternatives C and D could designate 13 primitive campsites, disturbing 26 acres in each alternative. Alternative B would designate 9 primitive campsites, disturbing 18 acres. Alternative E would designate 3 primitive campsites, disturbing 6 acres. Prior to any designation, these areas would be evaluated for presence of cryptobiotic soils, and impacts to cryptobiotic soils would be mitigated.

The various alternatives propose construction of facilities and campgrounds. Subsequent use of visitor site facilities and campgrounds would concentrate visitors, which could result in impacts to cryptobiotic soils around facilities. Projected increases in use in areas of existing and new facilities would increase impacts in these areas.

Group size limits and visitor allocations established to limit the number of people in specific areas are proposed for Alternatives B, C, D, and E. These limitations would reduce the potential for impacts to cryptobiotic soils.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

Allocations would be most widespread in Alternatives C and D, where allocations could be implemented on 1,684,899 acres, followed by Alternative B, where allocations could occur on 1,571,162 acres. In Alternative E, allocations could occur on 1,466,541 acres.

Research uses in the Monument could have both beneficial and adverse impacts on cryptobiotic soils. Beneficial impacts could result from research activities which increase knowledge of the distribution and nature of cryptobiotic soils in the Monument. Benefits to cryptobiotic soils from research use would be most likely to occur from Alternatives B and C. Adverse impacts could result from surface disturbing research activities or activities which remove or damage cryptobiotic soils. Research project design would be required to mitigate adverse impacts to cryptobiotic soils.

Livestock grazing impacts cryptobiotic soils by trampling. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on cryptobiotic soils would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

Alternatives B and C would authorize new water developments only when necessary for the protection of Monument resources. Alternative D would authorize no new water developments. Alternative E would allow new water developments for the protection of Monument resources, or for the management of livestock, wildlife, or visitor use. Water developments could disturb, damage, or destroy cryptobiotic soils as a result of surface disturbing construction, and impacts associated with the subsequent concentration of use in the immediate vicinity of some water developments, such as troughs or impoundments. Impacts to cryptobiotic soils would be mitigated through a clearance process that would assure that cryptobiotic soils were not present, or if such resources were present, move the development to a site which would not affect cryptobiotic soils. There would be no effects to cryptobiotic soils from such development in Alternative D since no new water developments would be authorized. Maintenance of existing water developments could disturb, damage or destroy cryptobiotic soils through surface disturbing maintenance activities. Clearances would be performed prior to the authorization of any maintenance activities, and measures would be taken to mitigate impacts to cryptobiotic soils.

In conclusion, although Alternatives B, C, D, and E could increase some risks of adverse impacts to cryptobiotic soils to varying

degrees, all would have a significant net beneficial impact due to the restrictions on access and use and due to mitigation. Alternative D, with the fewest miles of routes designated open, would have the least impact from vehicle travel, followed closely by Alternative B, and then by Alternatives C and E. The adverse impacts of the alternatives also vary according to the amount of surface disturbance and visitor use they allow. Total surface disturbance from construction of visitor facilities, campgrounds, and designated campsites would be greatest in Alternative E, followed by Alternatives C, D, and B. However, the majority of these impacts to cryptobiotic soils would be mitigated as discussed above.

### IMPACTS ON WILDLIFE

Monument wildlife includes all vertebrate and invertebrate animal species (aquatic and terrestrial), including insects, reptiles and amphibians, fish, birds, and mammals. Wildlife species are interrelated and interdependent; impacts to any one are likely to impact others.

Direct impacts to wildlife include disturbance or displacement due to interactions with humans. Indirect impacts include those from habitat degradation, habitat fragmentation, and disruption of food or water sources.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

### Alternative A (No Action)

In this alternative, many areas of the Monument would remain open to cross-country motorized and mechanized vehicle use. As a result, the potential for impacts on wildlife due to interactions with humans is highest in this alternative. The potential for impacts due to habitat degradation and habitat fragmentation related to route use and to cross-country vehicle travel is also highest in this alternative.

Visitor site facilities (trailheads, trails, interpretive sites, parking areas, etc.) could impact wildlife through increasing the potential for interaction with humans in those areas, and through habitat fragmentation and degradation. This alternative allows for the fewest facilities, therefore impacting wildlife the least of all alternatives in this respect. It would allow for 16 sites constructed or expanded, disturbing 8 acres.

Population growth, locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument, since visitor use is unrestricted in this alternative. This increased visitation would also increase the adverse impacts of visitor use on Monument wildlife.

Animal damage control activities would directly impact targeted wildlife species by

removing individual animals from the population. This could indirectly impact prey species' populations as well.

Research uses in the Monument could have both beneficial and adverse impacts on wildlife. Beneficial impacts could result from research activities which focus on increasing knowledge of the distribution and populations of wildlife in the Monument. Adverse impacts could result from surface disturbing or wildlife disturbing research activities. Research project design would be required to mitigate adverse impacts to wildlife.

Livestock grazing could impact wildlife by competing for habitat, especially in riparian areas. Livestock grazing could also impact wildlife by changing vegetation composition, impacting vegetation, and impacting habitat. Aquatic wildlife could be impacted by water quality degradation, and by reduction of vegetative cover in and near streams and water sources. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on wildlife would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

This alternative would allow new water developments when necessary for the protection of Monument resources.

Maintenance of existing water developments, and the construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could have adverse impacts on wildlife. Adverse impacts could result from surface disturbance and construction activities associated with new water developments, or the maintenance of existing water developments, or from habitat alteration associated with water developments.

In conclusion, this alternative has the greatest potential overall to impact Monument wildlife, primarily because it lacks restrictions on vehicle use and on visitor use. However, impacts attributable to the construction of visitor facilities, such as new trailheads or parking lots, would be less in this alternative.

### Alternatives B, C, D, E

In Alternatives B, C, D, and E, the Monument would be closed to motorized and mechanized cross-country travel. This would afford substantial protection to wildlife from the impacts of cross-country vehicle use, and from the effects of the increased access to

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

wildlife and wildlife habitat cross-country vehicle use would provide.

Alternatives B, C, D, and E would close portions of the Monument to motorized and mechanized vehicle use on routes. This would afford protection of wildlife by reducing access to them, and by reducing the potential for wildlife/human interactions. This protection would be the greatest in Alternative D, followed by Alternatives B, C, and E.

Visitor site facilities (trailheads, trails, interpretive sites, parking areas, etc.), could impact wildlife by increasing the potential for interaction with humans in those areas, and through habitat fragmentation and degradation. Alternatives C and D would have the least impact on wildlife from visitor site facilities, with 20 sites each, disturbing 10 acres. Alternative B would allow up to 32 sites, disturbing 16 acres, while Alternative E would allow 43 sites, disturbing 22 acres.

Population growth, locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument. That would increase the impact of visitor use on Monument wildlife.

Animal damage control activities would directly impact targeted wildlife species by removing individual animals from the

population. This could impact prey species' populations as well. Alternatives B and C would restrict animal damage control activities more than Alternative A, in that they would require that other means of control be exhausted prior to allowing animal damage control activities. Alternative E would restrict animal damage control activities where conflicts with visitor use occur, or where conflicts with objectives for management of fish and wildlife occur. Alternative D precludes animal damage control activities.

Research uses in the Monument could have both beneficial and adverse impacts on wildlife. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and populations of wildlife in the Monument. Benefits to wildlife from research use would most likely occur from Alternatives B and C. Adverse impacts could result from surface disturbing or wildlife disturbing research activities. Research project design would be required to mitigate adverse impacts to wildlife.

Livestock grazing could impact wildlife by competing for habitat, especially in riparian areas. Livestock grazing could also impact wildlife by changing vegetation composition, impacting vegetation, and impacting habitat. Aquatic wildlife could be impacted by water quality degradation, and by reduction of vegetative cover in and near streams and water

sources. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on wildlife would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

Alternatives B and C would authorize new water developments only when necessary for the protection of Monument resources. Alternative D would authorize no new water developments. Alternative E would authorize new water developments for the protection of Monument resources, or for the management of livestock, wildlife, or visitor use. Maintenance of existing water developments, and the construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could have adverse impacts to wildlife, resulting from surface disturbance and construction activities. The most adverse impact to wildlife from water developments would likely result from Alternative E, which allows water developments for reasons other than the protection of Monument resources

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

(and therefore would likely allow more water developments overall), followed by B and C. Alternative D would not permit new water development.

In conclusion, although Alternatives B, C, D, and E may increase some risks of adverse impacts to wildlife to varying degrees, all would have a significant net beneficial impact due to the restrictions on access and use and mitigation. Alternative D, with the fewest miles of routes designated open, would have the least impact from vehicle travel, followed closely by Alternative B, and then by Alternatives C and E. The adverse impacts of the alternatives also vary according to the amount of surface disturbance and visitor use they allow. Total surface disturbance from construction of visitor facilities would be greatest in Alternative E, followed by Alternative B and then Alternatives C and D. However, the majority of these impacts to wildlife would be mitigated as discussed above.

### IMPACTS ON THREATENED AND ENDANGERED ANIMAL SPECIES

There are 2 Federally listed threatened species and 6 Federally listed endangered species known within the Monument. The threatened species are the bald eagle and the Mexican spotted owl. The endangered species are the California condor, (an

experimental, non-essential population), the Colorado squawfish, American peregrine falcon, razorback sucker, the Kanab ambersnail, and the southwestern willow flycatcher. There are no known candidate species within the boundaries of the Monument.

The bald eagle, (*Haliaeetus leucocephalus*), was listed as endangered in 1967, before the passage of the Endangered Species Act in 1973. The United States breeding population had declined due to habitat destruction and degradation, illegal shooting, contamination of its food source and reproductive impairment from pesticides and heavy metals. In 1978, the bald eagle was listed as endangered in 43 of the lower 48 states, including Utah. Since that time, the nesting population has almost tripled, from fewer than 500 nesting pairs in 1963, to about 5,000 nesting pairs currently. In 1995, the bald eagle was reclassified to threatened in the lower 48 states in recognition of its improved status. Although the bald eagle is not known to nest in the Monument, it does occur routinely in winter, and has been reported from numerous locations within the Monument. Threats to the species include loss of suitable habitat, mortality from shooting, poisoning, electrocution, and other causes, and reduced reproduction caused by environmental contaminants.

The Mexican spotted owl, (*Strix occidentalis lucida*), was listed as a threatened species in 1993. The population had declined due to

habitat loss and alteration. Harvest of old-growth timber stands, even-aged timber harvest systems, and wildfires are contributing factors. It is estimated that there are at least 60 spotted owls in Utah, primarily in the southern part of the State. Its populations in Utah are small and scattered, mainly in rocky canyon country. It is known to nest within the Monument. Threats to the species include timber harvest and fire; livestock grazing and recreational activities have also been suggested as threats.

The California condor (*Gymnogyps californicus*), was listed as an endangered species in 1967. In late 1996 there were 121 California condors in the world; of those, 17 were in the wild in California. The other 104 were in captive breeding facilities. In 1996 and 1997, releases of the condor were made in Northern Arizona under Section 10(j) of the Endangered Species Act and its “non-essential, experimental population” designation. Nineteen birds have been released; 15 remain in the wild. Condors have been sighted flying over the Monument, and have been sighted at several locations to the northeast and northwest of the Monument. Threats to the species include mortality from collisions with powerlines, poisoning, and shooting.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

The peregrine falcon (*Falco peregrinus*), was listed as an endangered species in 1970. It is expected to be proposed for delisting in August, 1998. The population had declined due primarily to the use of organochloride pesticides. In 1975, the population reached a low of 324 nesting pairs in North America. The banning of DDT made the recovery of the peregrine falcon possible, but the recovery was accelerated by captive breeding programs, reintroduction efforts, and protection of nest sites. More than 6,000 falcons have been reintroduced into the wild since 1974. In Utah, it is estimated that there are about 180 breeding pairs, including some within the Monument. Threats to the species include loss of suitable habitat, mortality from shooting, and reduced reproduction caused by environmental contaminants.

The southwestern willow flycatcher (*Empidonax traillii extimus*), was listed as an endangered species in 1995. The population has declined due to habitat loss and modification, and to brood parasitism by the brown-headed cowbird, among other things. The known breeding population is estimated at between 300 and 500 pairs, with only about 75 sites where it is known to breed. In Utah, the southwestern willow flycatcher occurs in the southern third of the state, including within the Monument. Its decline in Utah is attributed to habitat losses to suburban expansion and other changes along the Virgin

River, inundation by Lake Powell on the Colorado and San Juan Rivers, and encroachment of tamarisk throughout the region, as well as to brood parasitism by the brown-headed cowbird. Surveys in 1996 revealed 25 individuals in Utah; presumably, the actual population is larger. The southwestern willow flycatcher is present and presumed to nest within the Monument. Threats to the species include habitat loss, livestock impacts, tamarisk invasion, water development, floods, gene pool limitation, and cowbird parasitism.

The Colorado squawfish (*Ptychocheilus lucius*), was listed as an endangered species in 1967. The razorback sucker (*Xyrauchen texanus*) was listed as an endangered species in 1991. Both historically were found in the Colorado River basin, but populations declined due to changes in stream flow and water temperatures, direct loss of habitat due to inundation by reservoirs, blockage of migration routes, and the introduction of non-native fish. Although it is unlikely that either of these fish occur within the Monument's boundaries, Colorado squawfish and razorback suckers do occur in Lake Powell. Management actions within the Monument, if they deplete or degrade water flowing into Lake Powell, could impact these fish.

The Kanab ambersnail (*Oxyloma haydeni kanabensis*), was listed as an endangered species in 1992. It is extremely rare, known only from a few locations in Utah and Arizona. It has not

been documented with the Monument, but may occur there where suitable habitat exists. The Kanab ambersnail is a land snail, but it lives at the edge of water on damp substrates, including on bedrock supporting algae. It may also be found on the stems of semiaquatic plants. Threats to the ambersnail include habitat loss or degradation, and its extremely small population numbers.

### Alternative A (No Action)

In this alternative, many areas of the Monument would remain open to motorized or mechanized cross-country travel. The potential for impacts to threatened and endangered species from interactions with people would continue, due to the continued accessibility of much of the Monument. There are currently no known conflicts with threatened or endangered species within the Monument.

Southwestern willow flycatcher habitat in the Escalante River drainages would remain closed to motorized and mechanized use in this alternative. However, this alternative would allow continued motorized and mechanized use of approximately 38 miles of known or potential southwestern willow flycatcher habitat within Paria River riparian

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

areas. If motorized and mechanized use were to increase during the nesting season (May through June), it could reduce nesting success of this species. Any reduction in nesting success could be considered an adverse effect to this species, so mitigating measures would be implemented.

No proposed visitor site facilities (trailheads, trails, interpretive sites, parking areas, etc.) would be constructed if direct or indirect impacts to a listed threatened and endangered species were identified.

Population growth, locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument, since visitor use is unrestricted in this alternative. If increased visitation were found to have adverse impacts on threatened and endangered species, mitigating measures, such as closures or allocations, would be implemented.

Research uses in the Monument could have beneficial impacts to threatened and endangered animal species. Beneficial impacts could result from research activities which focus on increasing the knowledge of the threatened and endangered animal species in the Monument, or which result in stabilizing or preserving threatened and endangered animal species. Surface disturbing research activities would be

modified to avoid areas with threatened and endangered species, or the research activities would not be permitted.

Livestock grazing could impact threatened and endangered animal species through surface disturbance, streambank disturbance, removal of vegetation, water quality degradation, increased erosion and siltation, trampling, alteration of the composition of vegetative associations, and competition with wildlife. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on threatened and endangered species would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

This alternative would allow new water developments to protect Monument resources, and would allow the maintenance of existing developments, provided Monument resources were protected. Prior to the construction of new or maintenance of existing water developments, clearances would be conducted to identify threatened or endangered species or their habitat.

Maintenance of existing water developments and the construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, would not be permitted if direct impacts to a listed threatened and endangered species were identified. If indirect impacts from water developments were to degrade or fragment habitat, disrupt nesting cycles, or disrupt water sources of threatened or endangered animal species, the maintenance of existing and construction of new water developments would not be permitted.

In conclusion, lack of cross-country vehicle travel restrictions in this alternative would allow potential impacts to threatened and endangered animal species through ground disturbance. This alternative also increases the potential for interactions of threatened and endangered species with humans. However, prior to any action, the BLM would conduct surveys to ensure that those actions would not jeopardize the continued existence of threatened or endangered species.

### **Alternatives B, C, D, E**

Alternatives B, C, D, and E close the Monument to motorized and mechanized cross-country travel. Surface disturbance from cross-country vehicles would therefore not occur, and the potential for impact to

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

threatened and endangered species from interactions with people would be reduced. Alternatives B, C, D, and E would close portions of the Monument to motorized and mechanized vehicle use on routes. This would afford protection of threatened and endangered animals by reducing access and resultant impacts. This protection would be greatest in Alternative D, with 760 miles of routes designated open, followed by Alternative B, with 818 miles of routes designated open. Alternative C would provide 1,187 miles of routes designated open, and Alternative E would designate 1,264 miles open.

Alternatives B, C, D, and E would continue the closure of the Escalante River drainages to motorized and mechanized vehicle use. Alternatives B, C, and D would also close the Paria River corridor to motorized and mechanized vehicle use. This would prevent any impacts from these uses on threatened and endangered species in those areas. Alternative E would close all but a small portion of the Paria corridor to such use; if conflicts with threatened and endangered species were to occur in the open portion, mitigating measures would be implemented.

Alternatives B, C, D, and E propose construction of visitor site facilities (trailheads, trails, interpretive sites, parking areas, pullouts). None of the construction

activities in any of the Alternatives B, C, D, and E would be anticipated to directly or indirectly affect any threatened or endangered animal species in the Monument. Clearances would be conducted prior to any construction. If threatened and endangered species or their habitat were identified, no construction would be allowed.

Population growth locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument. That would increase the impact of visitor use on threatened and endangered species. Specifically, there could be increased interaction with spotted owls and increased interaction with southwestern willow flycatcher populations along riparian areas in popular hiking locations.

Alternative E would have the highest potential for threatened and endangered species to interact with humans, as the management emphasis of this alternative would result in the largest increase in visitor use within the Monument. However, the potential for indirect impacts to threatened and endangered animal species is expected to be limited. Alternative D would have the least potential for interactions with humans, as this alternative would promote/allow the least amount of increase in visitor use within the Monument. Alternatives B and C would

each have a moderate level of potential impacts from human interactions.

Alternatives B, C, D, and E allow allocations, which could be used to control visitation as population and tourism pressures increase. This would be used to protect threatened and endangered animal species. Visitor allocations would be most widespread in Alternatives C and D, where allocations could be implemented on 1,684,899 acres, followed by Alternative B, where allocations could occur on 1,571,162 acres. In Alternative E, allocations could occur on 1,466,541 acres.

Research uses in the Monument could have beneficial impacts to threatened and endangered animal species. Beneficial impacts could result from research activities which focus on increasing the knowledge of the distribution and type of threatened and endangered animal species in the Monument, or which result in stabilizing or preserving threatened and endangered animal species. Research activities which adversely impact threatened and endangered species would not be permitted.

In Alternatives B and C, biological inventories to detect the presence of threatened and endangered species and their habitat would be a high priority, as would management actions to protect those species and their habitat. Research related to those species and threats

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

to them, including habitat restoration research and adaptive management techniques, would be encouraged and supported in both Alternatives B and C. Alternatives D and E would allow such research, but it would not be encouraged and supported to the extent it would in Alternatives B and C.

Livestock grazing could impact threatened and endangered animal species through surface disturbance, streambank disturbance, removal of vegetation, water quality degradation, increased erosion and siltation, trampling, alteration of the composition of vegetative associations, and competition with wildlife. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on threatened and endangered species would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

Maintenance of existing water developments, and the construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines and impoundments, would not be permitted if direct impacts to a listed

threatened and endangered species were identified. If indirect impacts to threatened or endangered animal species were identified, the maintenance of existing and construction of new water developments would not be permitted. Clearances would be used to identify threatened or endangered animal species or their habitat prior to the construction or maintenance of any new water developments.

Fire management, including suppression activities, would consider and prevent potential impacts to threatened and endangered species, including the Mexican spotted owl and the southwestern willow flycatcher.

In all alternatives, powerlines would be required to meet non-electrocution standards for raptors.

In conclusion, Alternatives B, C, D, and E would not adversely affect threatened and endangered animal species or their habitat. Where threatened and endangered species are known to occur, the BLM would evaluate actions and modify them to ensure that they do not jeopardize the continued existence of the species.

### **IMPACTS TO THE PAUNSAUGUNT DEER HERD**

The Paunsaugunt deer herd is the largest population of trophy class mule deer in the western United States.

Impacts to the Paunsaugunt deer herd come primarily from interactions with humans. In particular, deer are sensitive when on their winter range (mid-October to April). During this time, deer are considered susceptible to human interference and physiological stress. Additional impacts include collision with vehicles, habitat destruction, and loss of forage.

#### **Alternative A (No Action)**

In this alternative, much of the Paunsaugunt deer herd area would remain open to unregulated cross-country vehicle travel. Lack of limitations on motorized and mechanized use would increase accessibility throughout the herd area.

Construction of visitor site facilities within the deer herd area would be minimal in this alternative. Overall recreational use in the herd area is expected to remain low in this alternative. Significant impacts from habitat loss and human interactions would not be expected.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

Population growth, locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument, since visitor use is unrestricted in this alternative. This increased visitation would also increase any adverse impacts of visitation on the Paunsaugunt deer herd.

In conclusion, this alternative would have the greatest impact on the Paunsaugunt deer herd due to lack of cross-country vehicle travel restrictions in the majority of the sensitive herd areas. Unregulated motorized and mechanized vehicle use could result in deer being subjected to human interference and physiological stress.

### **Alternatives B, C, D, E**

Each of the Alternatives B, C, D, and E would eliminate all forms of cross-country vehicle travel within the Paunsaugunt deer herd area. Therefore, adverse habitat impacts from these activities are not anticipated.

Alternative C would eliminate all vehicle access to much of the sensitive deer herd areas, while the remaining area would be accessible only on designated routes. This alternative would result in the least potential for interactions with humans. In particular, this alternative would benefit the herd most during important migration periods and

would also eliminate interaction on much of the important winter range.

Alternatives B, D and E would have virtually identical impacts. The majority of the herd area would continue to have vehicle access on designated routes. As a result, these three alternatives afford less protection than Alternative C to the herd, especially during migration times and during herd use of winter range. A greater potential for vehicle collision and animal stress would occur during these periods.

The effects of the construction of visitor facilities, including trailheads, trails, interpretive sites, parking areas, and restrooms would be the same regardless of the alternative (B, C, D, E). Visitor facilities would result in additional use during periods when deer migration is occurring. Such increased interactions could cause stress-related impacts to the deer herd. Construction of these facilities and associated routes would also destroy a small amount of habitat.

No developed campgrounds are proposed in the deer herd unit and overall recreation use (including dispersed camping and camping in designated primitive sites) in the area would continue to remain low in each of the Alternatives B, C, D, and E. The majority of camping use in the deer area is most likely in response to the hunting opportunities

associated with this herd. Overall, such use would have a negligible impact on the health of the herd.

In conclusion, Alternatives B, C, D, and E reduce impacts to the Paunsaugunt deer herd by eliminating motorized and mechanized cross-country travel. Alternative C affords the greatest protection to the herd from motorized and mechanized travel. Impacts to the deer herd under the other Alternatives B, C, D, and E (B, D, and E) would be virtually identical, since the majority of the herd area would continue to remain accessible to vehicles only on designated routes.

### **Other Environmental Factors**

#### **IMPACTS ON SURFACE WATER QUALITY**

Impacts to surface water quality come from cross-country vehicle travel, the use of vehicles on poorly-constructed routes, livestock grazing, and visitor use. The effects of cross-country travel 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 sedimentation of water resources. The effects of travel on poorly-constructed routes are similar to the cross-country effects. Thus, the

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

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 include contamination of water sources by waste products, and sedimentation from soil erosion due to trampling.

### **Alternative A (No Action)**

Much of the Monument would remain open to motorized and mechanized cross-country vehicle travel, and related water quality impacts would continue. As visitation increases, these impacts would also be expected to increase, thereby resulting in a decrease in surface water quality.

Other impacts on water quality are related to recreational use and livestock grazing. Both could result in degradation of water quality due to contamination with waste products, and due to trampling, soil erosion, and subsequent sedimentation.

Construction of visitor site facilities could disturb 8 acres. Impacts to surface water quality from this disturbance would be minimal. Visitor facilities would be constructed in a manner that sediments or other contaminants would not be introduced into water courses.

In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the effects of livestock grazing on water quality would be assessed, and if adverse impacts were found, adaptive management measures could be implemented

Population growth locally and nationally, and the growth of tourism regionally, would increase the numbers of people visiting the Monument in this alternative. This would add to the impacts on surface water quality.

Research uses in the Monument could adversely impact surface water quality where research activities cause surface disturbance, which could increase erosion. Research project design would be required to mitigate adverse impacts on water quality. This alternative would allow the construction of new water developments to protect Monument resources. The construction of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could have both beneficial and adverse effects on surface water quality. Benefits could occur from water developments that move livestock away from springs and streams, decreasing erosion and

other water quality problems associated with livestock. Conversely, water development construction activities and trampling associated with the concentration of use around water developments, such as troughs and impoundments, could lead to erosion, which could adversely affect surface water quality. Adverse impacts could also occur if a significant amount of water were piped away from the source, resulting in reduced flow rates or dewatering and subsequent water quality impacts. Impoundments could have an adverse impact by retaining water, which would otherwise flow downstream.

The design and location of water developments would be required to prevent or mitigate adverse impacts to water quality, or the developments would not be permitted.

Water quality degradation would adversely affect biological resources, including plant and animal communities associated with degraded water sources. It could also affect recreational use, if drinking water were to become more difficult to acquire.

In conclusion, lack of cross-country vehicle travel restrictions would allow impacts to surface water quality to continue. It would also increase as use increases. Recreational use would also impact water quality. The resulting water quality impacts would, in turn,

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

adversely effect Monument biological resources and visitor use.

### **Alternatives B, C, D, E**

Alternatives B, C, D, and E close the Monument to motorized and mechanized cross-country travel, and restrict vehicle travel to designated routes. The impacts of travel on poorly-constructed routes would vary in extent, since each alternative designates a different number of miles of open routes.

Other impacts on water quality are related to recreational use and livestock grazing. Either could result in degradation of water quality due to contamination with waste products, from trampling, soil erosion, and sedimentation. Impacts due to recreational use could be mitigated through regulation, interpretation, or other visitor management techniques.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, picnic areas, pullouts, and restrooms ,would create surface disturbance in all alternatives. The least disturbance would occur in Alternatives C and D, disturbing 10 acres each over 15 years. Alternative B would disturb 16 acres, and Alternative E would disturb 22 acres over 15 years. Impacts to surface water quality from this disturbance

would be minimal. Visitor facilities would be constructed in such a manner that sediment or other contaminants would not be introduced into water courses.

Implementation of visitor allocation systems to limit recreational use could mitigate impacts of increased use. Allocations would be most prevalent in Alternatives C and D, where allocations could be implemented on 1,684,899 acres, followed closely by Alternative B, where allocations could occur on 1,571,162 acres. Allocations could occur on 1,466,541 acres in Alternative E.

Research uses within the Monument could have both beneficial and adverse impacts on water quality. Beneficial effects could result from research which increases our understanding of water quality factors. Research uses could adversely impact surface water quality if research activities were to cause surface disturbance, which could increase erosion. Research project design would be required to mitigate adverse impacts to water quality.

In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that

process, the effects of livestock grazing on water quality would be assessed, and if adverse impacts were found, adaptive management measures could be implemented.

Alternatives B and C would allow construction of new water developments only when such developments protect Monument resources. Alternative E would allow the construction of new water developments for the management of livestock, wildlife, or visitor use, in addition to protecting Monument resources. In Alternatives B, C and E, the construction of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could have both beneficial and adverse effects on water quality. Beneficial effects could occur if new water developments move livestock away from springs and streams, decreasing erosion and other water quality problems associated with livestock. Conversely, water development construction activities and trampling associated with the concentration of use around water developments such as troughs and impoundments could lead to erosion, which could adversely affect surface water quality. Alternative D would not allow the construction of water developments.

Adverse impacts could occur if a significant amount of water were piped away from the source, resulting in reduced flow rates or

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

dewatering and subsequent water quality impacts. Impoundments could have an adverse impact by retaining water which would otherwise flow downstream. Adverse impacts would be avoided by the design of the water developments before water developments would be authorized.

Alternatives B, D and E would include water quality monitoring and mitigation in high-risk areas, further reducing the potential for water quality degradation.

In Alternatives B, C and E, the BLM would request and assist the State of Utah in development of TMDLs for the four “Section 303(d)” stream segments in the Monument, which could accelerate water quality improvements there.

In conclusion, Alternatives B, C, D, and E would generally benefit surface water quality by reducing vehicle use, and subsequently decreasing erosion and sedimentation.

Alternatives B, C, D, and E could control the impacts of increased visitor use through allocation systems. Alternatives B, D and E could address water quality degradation through a monitoring and mitigation program.

### IMPACTS ON AIR QUALITY

Impacts on air quality come primarily from sources outside the Monument. However,

short-term air quality effects could arise from vehicle use on dirt routes, and from wind-blown dust.

#### Alternative A (No Action)

The Monument currently is an attainment area for the National Ambient Air Quality Standards (NAAQS) and is Class II under the Federal Prevention of Significant Deterioration (PSD) program. The Monument is surrounded by Class I areas: Bryce Canyon National Park is on the northwest boundary; Zion National Park is nearby to the southwest, and Capitol Reef National Park is on the northeast boundary.

Air quality within the Monument meets national standards. Anticipated construction and vehicle use on unpaved routes would result in localized increases in fugitive dust that would be temporary and would not exceed air quality standards.

Increases in population and development regionally could have an impact on Monument air quality. If Monument air quality were to deteriorate, visitor experiences would be impacted, and biological and cultural resources could be impacted. However, the location of the Monument, surrounded by Class I areas, could effectively limit that deterioration in and around the Monument.

#### Alternatives B, C, D, E

In Alternative D, the BLM would pursue obtaining a PSD Class I Air Quality redesignation for the Monument. This objective could be reached by working with the State of Utah to pursue redesignation legislation. In Alternatives B, C, and E, redesignation would not be pursued. Alternative D could provide additional protection of Monument air quality in the long-term, although the presence of Class I areas surrounding the Monument could have the same effect.

In Alternatives B, C, D, and E, the anticipated levels of construction, and of vehicle use on unpaved routes, would result in localized increases in fugitive dust that would be temporary and would not exceed air quality standards.

In conclusion, although regional growth and development could result in air quality degradation, none of the alternatives would contribute to that degradation. Alternative D, which proposed to pursue redesignation to Class I, could protect against air quality degradation, although the protection could be inconsequential.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

### IMPACTS ON WILD AND SCENIC RIVER VALUES

Impacts on Wild and Scenic River values would come from development actions that would diminish the outstandingly remarkable values and free flowing values that make the river eligible. These potential impacts are described below.

#### Alternative A (No Action)

In this alternative, all 25 eligible river segments would remain eligible and would not be considered for suitability, but would remain indefinitely under protective management. This protective management is subject to valid existing rights and to actions within the BLM's authority. It consists of a case-by-case review of proposed actions to assure that outstandingly remarkable values and the free flowing values are considered in evaluating proposed actions.

This alternative would assure consideration in future decision making of the values and characteristics that make the river segments eligible.

#### Alternatives B, C, D, E

Designation of specific river segments to the National Wild and Scenic Rivers System is

possible under Alternatives B, D, and E. The number of segments recommended as suitable varies by alternative. Alternatives B and E would each include 252 miles of river recommended as suitable. Alternative D would recommend all eligible segments as suitable, for a total of 330 miles. Alternative C would recommend none of the eligible segments as suitable.

Alternatives B, D, and E would maintain the outstandingly remarkable values and free flowing values for the segments recommended as suitable in each alternative. Alternative C would not specifically protect outstandingly remarkable values and free flowing values, but through management prescriptions aimed at protecting Monument resources, would likely prevent significant degradation of the outstandingly remarkable values for eligible segments. The BLM does not anticipate any changes to the free-flowing characteristics of these rivers to the degree that they would affect eligibility/suitability.

While the BLM makes recommendations for inclusion into the National Wild and Scenic River System, only Congress or the Secretary, upon application of the Governor, could designate a river to the National Wild and Scenic River System. Actual designations, if any, may or may not follow the recommendations made in this document.

If designated, the values that make these stream segments eligible for congressional or administrative designation into the Wild and Scenic River System would be protected by management prescriptions in this plan or a subsequent river management plan that would limit potential surface disturbance for the ½ mile-wide corridor. The values and characteristics that make the segments eligible and suitable for potential congressional designation would be maintained by the plan's management prescriptions.

### Monument Uses and Users

#### IMPACTS ON RESEARCH ACTIVITIES

Research opportunities in the Monument would be affected by the access and management features of alternatives. For example, research opportunities related to functioning ecosystems may be enhanced by non-surface disturbing activities and minimum recreation. Conversely, surface-disturbing research such as excavations of archaeological and paleontological sites might best be accommodated through alternatives that provide more access for researchers. All types of research might benefit from research-oriented management strategies.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

### Alternative A (No Action)

Cross-country travel using motorized and mechanized vehicles could occur on large portions of the Monument. Cross-country vehicle use would be limited to existing routes on about 15 percent of the Monument, and 4 percent of the Monument would be closed to cross-country vehicle use. This alternative would allow vehicular access to more areas than any other alternative, thereby enhancing accessibility for research activities. It would also allow greater numbers of visitors to more areas of the Monument, thereby detracting from ecosystem and land management-based research to the extent that they depend upon intact Monument resources.

Animal damage control activities would directly impact research related to wildlife populations and to natural systems by removing animals from those populations and systems. This could affect the validity of the research result, and could reduce the value of the Monument for such research.

In conclusion, although this alternative provides the greatest access for research, it also provides the least protection for the research value of Monument resources.

### Alternatives B, C, D, E

In Alternatives B, C, D, and E, the Monument would be closed to motorized and mechanized cross-country travel. This would protect resources from degradation from increased visitor access by cross-country vehicles. It would also reduce the accessibility of portions of the Monument to researchers.

Animal damage control activities would directly impact research related to wildlife populations and to natural systems by removing animals from those populations and systems. This could affect the validity of the research result, and could reduce the value of the Monument for such research. Compared to Alternative A, Alternatives B, C, D, and E would have less impact on research activities, because all restrict animal damage control activities more than Alternative A. In addition, Alternatives B and C require other measures be exhausted prior to using animal damage control activities. Research might benefit from opportunities to study the effectiveness of other measures to control predators in Alternatives B and C. Alternative D would not impact research activities, because it would not include animal damage control activities. Administratively, research would be best facilitated in Alternative C, as Monument management would focus on maximizing

opportunities for research, and research would tend to take precedence over other uses when conflicts among them occur. Alternative B could also maximize opportunities for research, but would not necessarily give research precedence over other uses when conflicts occur.

Alternatives B, C, D, and E would all protect the research value of Monument resources. Alternative C would provide the greatest administrative support for research, followed by Alternative B.

### IMPACTS ON LIVESTOCK OPERATIONS

Livestock operations occur throughout the Monument. Impacts to livestock operators come from interactions with visitors, access provisions, and other management factors.

### Alternative A (No Action)

Cross-country motorized travel and more open access on existing routes would facilitate livestock management. Greater access would also increase the interaction of the public with livestock, and with fences, corrals, and water developments. It is likely that livestock would be harassed, that gates would be inappropriately left open or closed, and that range improvements would be damaged by the

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

public in this alternative because visitor access would be less restricted.

Permitting water development when necessary to protect Monument resources could benefit livestock operations by providing new water sources to help meet resource condition objectives.

Animal damage control activities could directly impact livestock operations by removing animals known to have killed livestock. This could reduce predation on livestock.

### **Alternatives B, C, D, E**

The type and availability of access are significant factors relative to measuring impacts on livestock operations. Alternatives B, C, D, and E would place various limitations on both public vehicle access and on administrative vehicle access that might be available to the livestock operator. Greater administrative vehicle access would facilitate livestock operations, while reduced vehicle access for the general public would reduce livestock harassment, damage to range improvements, and gate problems associated with public access.

Administrative vehicle access would be granted on a case-by-case basis. However, the potential for administrative access would

be greatest in Alternative B, followed by Alternative C, and Alternative E. Alternative D would provide the least potential for administrative vehicle access.

Public vehicle access would be least in Alternative D, with 760 miles of routes designated open, followed closely by Alternative B, with 818 miles designated open. Alternative C (1,187 miles open), and Alternative E (1,264 miles open) would provide more public vehicle access than B or D.

Alternatives B, C, and E do not preclude providing new water sources for livestock outside of riparian areas. The replacement of old water developments and the development of new ones could help in achieving resource condition objectives. Alternative D would preclude new water developments.

In Alternatives B, C, D, and E, animal damage control activities would directly impact livestock operations by removing animals known to have killed livestock. This could reduce predation on livestock. Alternatives B and C restrict animal damage control activities, while making greater use of other measures to prevent predation. Although the resultant impacts cannot be determined now, it is possible that livestock operations could benefit from improved management practices that result from actions in Alternatives B and

C. Alternative E would restrict animal damage control activities, compared to Alternative A. Alternative D would preclude animal damage control activities.

In conclusion, Alternative B could benefit livestock operators through its access provisions. Alternatives C, D, and E may have fewer impacts to livestock operators due to fewer access provisions. Construction of new water developments to achieve resource condition objectives would be unavailable in Alternative D, possible under limited conditions in Alternatives B and C, and least restricted in Alternative E.

### **IMPACTS ON FORESTRY PRODUCT USE**

The collection of forestry products in the Monument is limited to designated areas and is by permit. Current use is low. Actual cutting areas would be determined under a permit system, and would be the same in all of the alternatives. No commercial collection of products would be allowed, except as authorized in designated areas for resource management objectives. Impacts to these activities come from restrictions to travel off designated routes, limits on location of collection, and by restrictions on non-commercial collection. It is assumed that restrictions on cross-country vehicle use

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

could directly affect these activities, as described below.

### **Alternative A (No Action)**

Cross-country travel could occur on a large portion of the Monument. Fuelwood cutting areas would be designated in areas where motorized access is designated. This alternative would not restrict travel in fuelwood cutting areas and would therefore facilitate easy collection of forestry products.

### **Alternatives B, C, D, E**

In Alternatives B, C, D and E, the Monument would be closed to motorized and mechanized cross-country travel. These restrictions could limit forestry product collection activities to travel on designated routes, making it difficult to access areas and load products in vehicles.

### **IMPACTS ON RECREATIONAL USE**

Visitors come to the Monument for many reasons and have a variety of expectations. Some people are attracted to the area for its opportunities for a primitive experience. Others desire motorized and mechanized recreation, either in groups or as individuals. Still others may wish to hunt or fish, study, or become educated about Monument resources.

### **Alternative A (No Action)**

The current level of cross-country vehicle use in the Monument is low, but has been increasing. Overall visitor use is expected to increase, resulting in increased encounters between cross-country vehicles and other users. Two informal all-terrain vehicle (ATV) "play" areas are currently used by cross-country vehicle enthusiasts; these areas would not be affected by this alternative. In this alternative, cross-country travel would be prohibited on 4 percent of the Monument) and would be limited to existing routes on 15 percent of the Monument. This could result in conflicts between motorized and mechanized recreation users and other visitors.

Construction of 16 visitor site facilities (including trailheads, trails, parking areas, pullouts, and restrooms) is possible in this alternative. These facilities would provide for visitor safety and use.

Completion of Calf Creek camping area would allow for a small increase in visitor numbers. The 21 existing designated primitive campsites would be continued. These facilities and areas would likely become overcrowded with increased visitation, decreasing the quality of the visitor experience.

No limitations on group size would be implemented in this alternative. This could impact a visitor's experience due to the increased noise and visual impacts of large groups.

Livestock grazing could impact recreational use by contaminating water sources, altering vegetation, and by aesthetic effects. In all alternatives, livestock grazing uses within the Monument would be managed in keeping with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the compatibility of livestock grazing with other land uses, including recreation, would be evaluated, and measures could be taken to resolve conflicts.

Animal damage control activities would directly impact visitor experience if the activities were observed by visitors. Animal damage control activities would indirectly impact visitor experience by removing animals which form part of the experience visitors may seek.

In conclusion, this alternative would result in the greatest number of unrestricted uses, with the fewest developments to support these uses. Crowding would likely occur in developed areas and on trails. Lack of group

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

size limits would impact visitor experience due to the noise and visual impacts of large groups.

### **Alternatives B, C, D, E**

None of Alternatives B, C, D, and E allow motorized or mechanized cross-country travel in the Monument.

In Alternatives B, C, D, and E, all routes would be closed to motorized or mechanized vehicle use unless designated open.

Alternative E would provide the greatest mileage of open routes, with 1,264 miles designated open. Alternative C would designate 1,187 miles open, while Alternative B would designate 818 open. Alternative D would designate the fewest miles of open routes, at 760 miles open.

Alternatives B and E would designate some routes as open to non-street-legal ATV and dirt-bikes. Alternative B would allow ATV use on 591 miles of the 818 miles designated open. Alternative E would allow ATV use on 980 miles of the 1,264 miles designated open. Alternatives C and D would provide no routes for non-street legal ATV or dirt bike use.

Alternatives B, C, and D would close the Paria River corridor to all forms of motorized and mechanized travel. Alternative E would

close the Paria River corridor except for the section through the Paria Box.

Construction of visitor facilities, including trailheads, trails, interpretive sites, parking areas, and restrooms within the Monument would provide limited services for visitors. Facilities would concentrate visitors at these locations. Alternatives B, C, D, and E would increase the number of visitor sites and facilities (Alternative E - 43 total sites, Alternative B - 32, Alternative C - 20, and Alternative D - 20).

There would be no new developed campgrounds in Alternatives B, C and D, although there would be designated primitive campsites in each alternative. Alternatives C and D would each provide 13 designated primitive campsites, while Alternative B would provide 9 designated primitive campsites. Keeping developed and designated camping opportunities at a minimum in the Monument would direct visitors to commercial sites near communities.

Limitation of group size could affect visitor experiences in a variety of ways. Groups would be limited to 12 people and/or animals in the majority of the Monument in Alternatives B, D, and E, thereby lessening the social encounters that any individual group could have. This could benefit those seeking primitive experiences, but could

impact those visitors wanting large group recreational experiences. In all alternatives, allocations on visitor numbers could be implemented to manage use levels or to protect Monument resources.

Animal damage control activities would directly impact visitor experience if the activities were observed by visitors. Animal damage control activities would indirectly impact visitor experience by removing animals which form part of the experience visitors may seek. Alternatives B, C, D, and E would have less impact on the visitor experience because all restrict animal damage control activities. Alternative D would not impact the visitor experience, because it would not include animal damage control activities. Alternatives B, C, and E all place restrictions on animal damage control; in addition, B and C require other measures be exhausted prior to using animal damage control activities. Alternatives B, C, and E would impact the visitor experience, but not to the extent Alternative A would.

Livestock grazing could impact recreational use by contaminating water sources, altering vegetation, and by aesthetic effects. On the other hand, some visitors enjoy viewing livestock and livestock operations. In all alternatives, livestock grazing uses within the Monument would be managed in keeping

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

with applicable laws and regulations, and with the statewide Standards and Guidelines. The process which would be used, and the schedule for its completion, are described in Chapter 2. As part of that process, the compatibility of livestock grazing with other land uses, including recreation, would be evaluated, and measures could be taken to resolve conflicts.

In conclusion, a variety of recreational opportunities would be available to a degree under all the Alternative B, C, D, and E. Access to the widest range of experiences, however, would be available in Alternatives B and E, since more interpretive sites and facilities would be developed. Alternative D would be the most restrictive to motorized and mechanized forms of recreation, but would provide visitors with the most opportunities for primitive experiences.

### IMPACTS ON OUTFITTERS AND GUIDES

#### Alternative A (No Action)

Existing outfitter and guide permits would be allowed throughout the Monument in this alternative. Consistent with the Interim Guidance, however, no new outfitter or guide permits would be issued. Group size limits and allocations do not currently apply and

thus would not affect outfitter and guide operators.

Existing outfitters and guides would likely benefit the most in this alternative because new, competing permits would not be issued, and conversely, new outfitters and guides would be harmed. Existing outfitters and guides could not, however, expand their operations.

#### Alternatives B, C, D, E

Outfitters and guides would be permitted to varying degrees in Alternatives B, C, D, and E. Alternatives B, D, and E would allow permits for outfitter and guide operations throughout the entire Monument as long as the activity was appropriate to the management zone. Alternative D could have some areas identified where visitors would only be allowed with a designated outfitter or guide. Alternative C would permit outfitter and guide operations on the majority of the Monument, but would not allow outfitter and guide activities in the remainder of the Monument. In Alternatives B, C, D, and E, outfitter and guides would have to comply with the prescriptions that apply to each management zone, including access restrictions and group size limits. Allocations would apply to outfitters and guides in the zones where allocations could be used as a management tool.

Alternative E would likely benefit outfitters and guides the most because it would generate the highest visitation, would have the largest group size limit in the more heavily used zones, and would provide a wide array of recreational experience zones within which the outfitters and guides could operate. Alternatives B and D would allow outfitters and guides to operate by permit across the Monument, but would place restrictions on motorized access across a larger area and would have lower group size limits in the intensive zones. This could limit outfitters and guides offering motorized and/or large group outings, but could benefit those offering primitive guided experiences. Alternative C would allow outfitter and guide operations on a slightly smaller amount of the Monument, but would designate more routes open for motorized travel and would allow a moderate group size limit in the more heavily used zones.

### IMPACTS ON SCENIC QUALITY

Scenic quality is impacted by surface disturbance, which creates a contrast with the natural environment. All alternatives would impact scenic quality to varying degrees of magnitude as described below. The greater the amount of ground disturbance the greater the impact to scenic quality. It is assumed that an increase in visitation could directly and indirectly affect these resources.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

### Alternative A (No Action)

Motorized and mechanized cross-country travel would be allowed throughout many areas of the Monument. This use could potentially creating more noticeable intrusions which could detract from the scenic quality. Four percent of the Monument would remain closed to cross-country vehicle travel.

Construction of visitor site facilities such as trailheads, interpretive sites, parking areas, pullouts, and restrooms create surface disturbance. This alternative proposes the fewest number of visitor site facilities. Small recreation sites built within the Monument could detract from the scenic quality. The visual resource contrast rating system would be utilized as a guide to analyze potential visual impacts of facility design and placement. Visitor facilities would be designed to mitigate impacts and conform to the assigned visual resource management class objective. For this alternative, 8 acres of disturbance would occur from construction, which is less than in Alternatives B, C, D, and E.

Use of visitor site facilities would concentrate visitors. Projected increases in use in these areas would increase impacts to scenic quality. Group size, although not a principal factor impacting scenic quality, could be an

impact to other visitors if large groups concentrate in areas of high scenic value. With no group size limits or allocation proposed, this alternative has the potential to adversely impact to scenic quality.

The construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could adversely impact scenic quality. These impacts would occur primarily through surface disturbing construction, water developments which contrast with the characteristic landscape, and visual contrasts in vegetation associated with the concentration of use in the immediate vicinity of some water developments. Water developments which replace old developments and which contrast with the landscape could improve scenic quality.

The visual resource contrast rating system would be utilized as a guide to analyze potential visual impacts of water developments. Water developments would be designed to mitigate impacts and conform to the assigned Visual Resource Management Class objective. Maintenance of existing water developments could disturb, damage or destroy scenic quality through surface disturbing maintenance activities or surface disturbance caused by cross-country access with mechanized vehicles. The visual resource contrast rating system would be utilized as a

guide to analyze potential visual impacts of water developments. Water developments would be designed to mitigate impacts and conform to the assigned Visual Resource Management Class objective.

Research uses in the Monument could adversely impact scenic quality where research activities cause surface disturbance. The visual resource contrast rating system would be utilized as a guide to analyze potential visual impacts of research projects to scenic quality. Research design proposals would be required to mitigate impacts to scenic quality and conform to the assigned Visual Resource Management Class objective.

In conclusion, this alternative would have an impact on scenic quality. Protection of scenic quality from cross-country vehicle use would only occur on 4 percent of the Monument. Total surface disturbance from construction of visitor facilities would be 8 acres.

### Alternatives B, C, D, E

Designated routes would be open to motorized and mechanized use in Alternatives B, C, D, and E, but all alternatives would close the Monument to motorized and mechanized cross-country travel. These restrictions protect scenic

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

quality from impacts of surface disturbance caused by cross-country vehicle use and associated increased access.

Construction of visitor site facilities, such as trailheads, interpretive sites, parking areas, pullouts, and restrooms, create surface disturbance. The greater the number of facilities proposed, the greater the potential impacts to scenic quality. The greatest amount of disturbance would occur in Alternative E (22 acres), followed by Alternative B (16 acres), Alternative C (10 acres), and Alternative D (10 acres). The visual resource contrast rating system would be utilized as a guide to analyze potential visual impacts of facility design and placement. Visitor facilities would be designed to mitigate impacts and conform to the assigned Visual Resource Management Class objective.

Developed campgrounds and designated primitive campsites would affect scenic quality. The visual resource contrast rating system would be utilized as a guide to analyze potential visual impacts of campground design and placement. Campgrounds and campsites would be designed to mitigate impacts and conform to the assigned Visual Resource Management Class objective. The greater the size of the campground or the greater the number of designated areas, the greater the impacts to

scenic quality. In Alternative E it is assumed that one developed campground would be built, disturbing 15 acres. No other alternative would allow construction of developed campgrounds. Alternatives C and D could designate 13 primitive campsites, each disturbing 26 acres. Alternative B would designate 9 primitive campsites, disturbing 18 acres. Alternative E would designate 3 primitive campsites, disturbing 6 acres.

As described above, the various alternatives propose construction of facilities and campgrounds. Subsequent use of visitor site facilities and campgrounds would concentrate visitors. This could result in impacts to scenic quality around facilities. Projected increases in use in areas of existing and new facilities would increase impacts in these areas. Group size, although not a principal factor impacting scenic quality, could be an impact to other visitors if groups concentrate in areas of high scenic value. All alternatives limit group size to 12 in varying areas. Alternative D limits group size to 12 in the greatest areas followed by Alternatives B, E, and C respectively.

Alternatives B and C would authorize new water developments only when necessary for the protection of Monument resources, Alternative D would authorize no new water developments, and Alternative E would authorize new water developments for the protection of Monument resources, for the

management of livestock, wildlife, or visitor use. In Alternatives B, C, and E, impacts to scenic quality could result from surface disturbing construction, water developments which contrast with the characteristic landscape, and visual contrasts in vegetation associated with the concentration of use in the immediate vicinity of some water development such as troughs or impoundments. On the other hand, water developments that replaced old developments that contrast with the landscape could improve scenic quality.

The visual resource contrast rating system would be utilized as a guide to analyze potential visual impacts of water developments. Water developments would be designed to mitigate impacts and conform to the assigned Visual Resource Management Class objective.

Maintenance of existing water developments in Alternative B, C, D and E could disturb, damage or destroy scenic quality through surface disturbing maintenance activities. The visual resource contrast rating system would be utilized as a guide to analyze potential visual impacts of water developments. Water developments would be designed to mitigate impacts and conform to the assigned Visual Resource Management Class objective.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

Research uses in the Monument could adversely impact scenic quality where research activities cause surface disturbance which creates widely visible visual contrasts. The visual resource contrast rating system would be utilized as a guide to analyze potential visual impacts of research projects to scenic quality. Research design proposals would be required to mitigate impacts to scenic quality and conform to the assigned Visual Resource Management Class objective.

In conclusion, protection of scenic quality from the impacts of vehicle use would be greatest in Alternative D, followed by Alternatives B, E, and C. Total surface disturbance from construction of visitor facilities, campgrounds, and designated campsites would be greatest in Alternative E, followed by Alternatives C, D, and B. Visitor impacts would be greatest in Alternative E, followed by B, and least likely to occur in Alternatives C and D because Alternative E has the least controls on group size and allocations followed by B, C, and D respectively.

### **IMPACTS ON PRIMITIVE UNCONFINED VALUES**

Primitive unconfined values include naturalness, solitude, or a primitive and unconfined type of recreation. Primitive

unconfined values are impacted by noticeable imprints of humans, recreation that requires motorized and mechanized equipment or facilities, and the ability of a user to find a secluded spot.

### **Alternative A (No Action)**

This alternative would allow motorized and mechanized cross-country travel throughout many areas of the Monument. Cross-country motorized and mechanized use impacts primitive unconfined values by creating new trails and impacting naturalness, resulting in fragmentation of otherwise large contiguous areas. Therefore, opportunities for primitive unconfined values would not be protected from the sights and sounds of motorized and mechanized recreation. Effects on primitive unconfined values from increased use, and subsequent increased noise of dirt bikes and cross-country vehicles, would be high under this alternative.

Construction of visitor site facilities could concentrate visitor use at the developed sites and reduce impacts on primitive unconfined values in the rest of the Monument.

Not limiting group sizes could increase the impacts on naturalness if large groups concentrate in campsites or on trails. Larger groups would negatively impact solitude in areas with primitive unconfined values,

although effects would be based on the numbers of groups and numbers of encounters, not just group size. Because group size limits and allocations would not be used, impacts from visitor use are expected to be greatest in this alternative.

Research uses in the Monument could adversely impact primitive and unconfined values where research activities cause surface disturbance. Research project design would be required to mitigate adverse impacts.

The construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, could adversely impact primitive and unconfined values of naturalness. Adverse impacts to elements of naturalness would occur primarily through surface disturbing construction, and the direct impacts associated with the subsequent concentration of use in the immediate vicinity of some water developments, such as troughs or impoundments. Maintenance of existing water developments could disturb, damage or destroy primitive and unconfined values of naturalness through surface disturbing maintenance activities.

In conclusion, lack of cross-country vehicle restrictions and unlimited access in this alternative would affect primitive unconfined

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

values. Large portions of the Monument would not be protected from the sights and sounds of motorized and mechanized recreation. This alternative would result in the greatest visitor use with the fewest restrictions, and would therefore provide the least opportunities for a primitive, unconfined experience.

### **Alternatives B, C, D, E**

Alternatives B, C, D, and E would not allow motorized and mechanized cross-country travel in the Monument. Routes for motorized and mechanized use would be designated in all alternatives. These restrictions would protect parts of the Monument from visitor impacts to primitive unconfined values by increasing opportunities for solitude and naturalness. Protection of primitive unconfined values from sights and sounds of motorized and mechanized use would be the greatest in Alternative D, followed by Alternative B, Alternative C, and Alternative E.

Construction of visitor site facilities such as trailheads, trails, interpretive sites, parking areas, and restrooms could concentrate visitor use and reduce impacts on primitive unconfined values in the rest of the Monument. In Alternatives B, C, D, and E, developed campgrounds and designated primitive campsites would encourage

concentrated use in developed and designated areas. This would enhance primitive unconfined values opportunities in other areas of the Monument.

Group size would be limited to no more than 12 people and/or animals on portions of the Monument in all alternatives. Limitations on visitor group size would partially mitigate the impacts of increased visitor use. These limits cover the greatest area in Alternative D, followed by Alternatives B, E, and C.

Research uses in the Monument could adversely impact primitive and unconfined values where research activities cause surface disturbance. Research project design would be required to mitigate adverse impacts.

Alternatives B and C would authorize new water developments only when necessary for the protection of Monument resources. Alternative D would authorize no new water developments. Alternative E would authorize new water developments for the protection of Monument resources, or for the management of livestock, wildlife, or visitor use. The disturbance, damage, or destruction of primitive and unconfined values in Alternatives B, C, and E could result from surface disturbing construction, and impacts associated with the subsequent concentration of use in the immediate vicinity of some water developments, such as troughs or

impoundments. Impacts to primitive and unconfined values in Alternative B, C, and E would be mitigated through a clearance process that would consider primitive and unconfined values in the decision. Mitigation of impacts to primitive and unconfined values in Alternative D would not be necessary since no new water developments would be authorized. Maintenance of existing water developments in Alternative B, C, D and E could disturb, damage, or destroy primitive and unconfined values through surface disturbing maintenance activities. Mitigation of maintenance impacts to primitive and unconfined values would be considered by performing a clearance prior to authorizing maintenance activities.

In conclusion, Alternative D would provide the greatest protection to primitive unconfined values by providing the largest contiguous area where these values are protected from large group size, motorized and mechanized vehicular access, and other visitor impacts. Alternatives B and E would provide substantial protection to primitive unconfined values. Alternative C would provide the least protection to primitive unconfined values.

### **IMPACTS ON LOCAL ECONOMIES**

The Monument Planning Office contracted with the Utah Governor's Office of Planning

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

and Budget to provide data and analysis relating to the economic and social impacts of the Monument management alternatives for inclusion in this Draft Management Plan and Draft Environmental Impact Statement. The Utah Governor's Office of Planning and Budget report presented background data on the economics and demographics of the region surrounding the Monument, and detailed the process and results of the analysis of socio-economic impacts from the management plan alternatives. Detailed information about these projections could be found in Appendix 19.

The impacts of the alternatives are driven by BLM spending and employment, as well as visitor spending. The direct, indirect, and induced effects of this direct employment and spending on population, employment, employee earnings, and local government revenues in southwest Utah are the focus of the analysis. Key findings of the analysis follow.

Overall impacts of the plan alternatives on the southwestern Utah population base are relatively small. The various management alternatives could add between six and 544 persons to a total population base of 212,603 in the year 2012. Peak population impacts occur in the year 2000, during construction of new Monument facilities, when the additional population base could range between 554 and

961. After construction activities cease, population increases would range between a loss of 10 to a gain of 28, depending upon the alternative considered.

Employment attributable to Monument activities is expected to peak during facility construction in the year 2000, when Monument activities could add between 351 and 615 jobs to an employment base of 74,457 in southwestern Utah. Total employment impacts attributable to the Monument in the year 2012 range from -1 to 248 added to a total employment base of 116,129. After construction activities cease, employment increases would range between a loss of 10 jobs to a gain of 18 jobs annually, depending upon the alternative considered.

For the most part, unchanging direct employment by the BLM results in a fairly steady earning stream throughout the study period analyzed. However, during facility construction the highest earnings are generated, ranging from \$10.8 million to \$18.4 million in the year 2000, depending upon the alternative considered. After construction, earnings stay quite steady, ranging between \$1.4 million and \$7.9 million in the year 2012.

Net revenues to local governments remain relatively small, again with the construction activities in the year 2000 providing the peak

revenue stream. In 2000, net revenues could range between \$351,000 and \$565,000. Because this item is so dependent upon projected visitation numbers, the assumptions made for the various alternatives produce a wide range of results by the year 2012, when net revenues range between a loss of \$36,000 to a positive \$330,000. This is a small proportion of expected local government revenues which total in the tens of millions of dollars.

### **Alternative A (No Action)**

The annual growth rate in visitation would be 4.7 percent in this alternative, with 217,190 visitor days in 1998, growing to 414,764 visitor days in 2012. Regional population growth attributable to this alternative would be 370 people in 2012. By 2012, the additional employment generated by this alternative would be 219 jobs, with employee earnings reaching \$6,001,000 in that year. Local government revenues attributable to this alternative would be \$516,000 in 2012, with expenditures of \$317,000, for a net revenue of \$199,000 to local governments.

### **Alternative B (Preferred)**

The annual growth in visitation in this alternative would be 5.2 percent, with 442,633 visitor days in 2012, 6.7 percent higher than Alternative A. Regional

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

population growth attributable to this alternative would be 422 people in 2012, compared to 370 people in Alternative A. By 2012, the additional employment generated by this alternative would be 248 jobs, compared to 219 in Alternative A. Employee earnings would reach \$6,636,000 in 2012, 10.6 percent higher than Alternative A. Local government revenues attributable to this alternative would be \$ 598,000 in 2012, with expenditures of \$362,000, for a net revenue of \$236,000 to local governments, 18.6 percent higher than in Alternative A.

### Alternative C

The annual growth in visitation in this alternative would be 3.7 percent, with 358,274 visitor days in 2012, 13.6 percent lower than Alternative A. Regional population growth attributable to this alternative would be 282 people in 2012, compared to 370 people in Alternative A. By 2012, the additional employment generated by this alternative would be 163 jobs, compared to 219 in Alternative A. Employee earnings would reach \$3,828,000 in 2012, 36 percent less than Alternative A. Local government revenues attributable to this alternative would be \$288,000 in 2012, with expenditures of \$245,000, for a net revenue of \$236,000 to local governments, 78 percent lower than the No Action Alternative.

### Alternative D

The annual growth in visitation in this alternative would be 1.2 percent, with 248,055 visitor days in 2012, 40 percent lower than Alternative A. Regional population growth attributable to this alternative would be 6 people in 2012, compared to 370 people in Alternative A. By 2012, this alternative would show a net loss of 1 job, compared to an increase of 219 jobs in Alternative A. Employee earnings would reach \$1,480,000 in 2012, 75 percent less than Alternative A. Local government revenues attributable to this alternative in 2012 would be less than expenditures, for a net revenue deficit of \$36,000.

### Alternative E

The annual growth in visitation in this alternative would be 6.3 percent, with 519,208 visitor days in 2012, 25 percent higher than Alternative A. Regional population growth attributable to this alternative would be 544 people in 2012, compared to 370 people in Alternative A. By 2012, the additional employment generated by this alternative would be 324 jobs, compared to 219 in Alternative A. Employee earnings would reach \$7,963,000 in 2012, 32.7 percent higher than Alternative A. Local government revenues attributable to this alternative would be \$792,000 in 2012, with expenditures of

\$462,000, for a net revenue of \$330,000 to local governments, 65.8 percent higher than in Alternative A.

In conclusion, Grand Staircase-Escalante National Monument is a large block of land located in a very sparsely settled area. All proposed management alternatives are driven by a basic intent to keep most of the landscape in its current condition, with very little new development expected. The steady operating budget, constant employee base, and fixed facility locations result in little variation between alternatives and over time. Overall, the impacts of the management alternatives are positive but small. Impacts to local government revenues and expenditures are also positive but relatively small.

The available economic information and analytical models are not specific to the Monument, but cover all of southwestern Utah as is appropriate for impact assessment purposes.

## Cumulative Impacts

### INTRODUCTION

Cumulative impacts are the effects on the environment which result from the incremental impact of any one of the alternatives in combination with other past,

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

present, and reasonably foreseeable future actions outside the scope of this plan, either within the Monument or outside it.

Cumulative impacts are discussed because the quality of the human environment is the result of many different factors, acting together. The real effect of any single action cannot be determined by considering that action in isolation, but must be determined by considering the likely result of that action when acting in conjunction with many others. These involve determinations that are of necessity complex, and are to some degree intuitive.

The cumulative impacts discussion which follows considers the alternatives in the context of the broader human environment. It includes a discussion of the factors such as livestock grazing that have brought that environment to its current state, and a discussion of factors such as population growth that could be expected to influence that environment in the future.

Data on the precise locations and overall extent of Monument resources, while considerable, varies according to resource type and locale. Further, our understanding of the impacts on and the interplay among these resources is evolving. As our data base and knowledge improves, adaptive management measures would be considered

to reduce potential cumulative impacts in accordance with law, regulation, and the Final Monument Management Plan.

### BACKGROUND

In the late 19th century, the small communities at the perimeter of the Monument experienced rapid growth. Most settlers were supported by livestock grazing or associated occupations such as freighting and merchandising. Some settlers capitalized on the timber from nearby plateaus, and established small sawmill operations. Higher than normal precipitation patterns and the native grasses of the region supported growing numbers of livestock and settlers. This 20 year growth pattern came to a halt near the turn of the century when overgrazing, declines in wool and beef prices, and drought combined to force many residents to leave the region. This out-migration continued through much of the 20th century, with occasional booms brought on by activities such as movie making, uranium exploration and mining, and the construction of Glen Canyon Dam. As a result, the landscape today includes hundreds of miles of rough routes developed for settlement and for mineral exploration; it includes a producing oil field; some active mines and numerous abandoned mines; fences, corrals, cabins, water developments, and altered vegetation associated with over a century of livestock grazing; and new

communities associated with Glen Canyon Dam and with Lake Powell, which is clearly visible to the south.

Livestock grazing in the region has evolved and changed considerably since it began in the 1860s. From that beginning, the number of cattle, sheep, and horses increased rapidly. At the turn of the century, large herds of livestock grazed on unreserved public domain in uncontrolled open range. Because the experience of stockmen was in more temperate climates, they knew little about the carrying capacity of these arid lands. Consequently, the range was stocked beyond its capacity, causing changes in plant, soil, and water relationships. Some speculate that the changes were permanent and irreversible, turning plant communities from grass and herbaceous species to brush and trees, which were less palatable to domestic livestock grazing animals. Protective vegetative cover was reduced, so less water infiltrated the soils. More runoff brought erosion, rills and gullies. Livestock grazing effects were pronounced in riparian areas, where results included reductions in understory vegetation, bank erosion, increased sedimentation in streams, and the introduction of weeds. In extreme situations, dewatering resulted from gully cutting which lowered water tables and dried up riparian areas and meadows.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

In response to these problems, livestock grazing reform began in 1934 with the passage of the Taylor Grazing Act. Subsequent laws, regulations, and policy changes have resulted in adjustments in livestock numbers, season-of-use changes, and other management changes.

The Proclamation which established the Monument stated that "...grazing use shall continue to be governed by applicable laws and regulations". Livestock grazing regulations were most recently revised in 1995, leading to the adoption, in 1997, of the Standards and Guidelines for Rangeland Health, which are now beginning to be applied statewide, including within the Monument. The new regulations, and the Standards for Rangeland Health and Guidelines for Grazing Management, give management priority to maintaining functioning ecosystems. Although they are just beginning to be implemented, it is likely that the new regulations, Standards, and Guidelines would have a beneficial effect on Monument resources over time.

There are currently two coal leaseholds and 80 active oil and gas leases within the Monument. Part of the Upper Valley Oil Field, a producing oil field, is within the Monument. Nevertheless, coal mining and oil and gas development within the Monument are not considered likely. The

Upper Valley Oil Field appears to be anomalous, rather than indicative of conditions elsewhere in the Monument (see Chapter 2, Alternatives Considered But Eliminated).

There are 71 mining claims within the Monument. Of these, six are considered "active". Five of the "active" permitted mining operations are alabaster/gypsum mines; the sixth is a titanium/zirconium claim. The Proclamation closed the Monument to any new mining claims, but valid rights existing at the time of the Proclamation may be exercised. If existing mining claims were developed, the effects could range from minor to profound, depending on the level of development, the location, and numerous other factors. Such development is considered unlikely.

The lands adjacent to the Monument are generally federal lands, managed by the BLM, the U.S. Forest Service, and the National Park Service. Management of those lands is likely to protect Monument resources. However, it is possible that land uses on the Dixie National Forest north of the Monument could effect water quality within the Monument, if livestock grazing, logging, and roads there were to increase sediment loads in streams, or effect other features of the watershed. It is also possible, in the long term, that the heavy visitation associated with the National Parks and National Recreation Area around the Monument would effect the Monument, both

by "overflow" visitation, and through visitor-related developments near the Monument boundary.

The Monument area is currently sparsely populated. Nevertheless, population growth is among the factors that would influence the Monument environment in the long term. Population growth in the region is projected to increase by 3 to 4 percent per year over the next 15 years. The potential for development of retirement communities is considered high in the southern part of the region, which could accelerate that growth. This is particularly true near the town of Big Water, where the pending land exchange between the State of Utah and the Department may make 33,208 acres available for private development.

Tourism in the region, specifically visitation to State and National Parks and Monuments, has shown strong growth over the past two decades. That growth is projected to continue, and could add to the level of development in the region beyond that attributable to population growth alone.

The development associated with both population growth and with the growth of tourism are likely to increase visitation to the Monument, to impact air quality, and to increase demands on municipal water

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

supplies. Solid waste and sewage treatment needs would increase. The landscape, which is largely open and undeveloped today, would probably become more roaded, and more developed, as the population and the infrastructure associated with it grows. Noise levels in the Monument could increase as developments, including regional airports, occur.

Growth would bring some adverse impact to air quality, as fugitive dust, automobile emissions, and other emissions associated with communities increase. The nearby Navajo Generating Plant, and regional haze moving in from outside the area, would continue to be the largest factors in air quality for the foreseeable future, however. The continued installation of scrubbers at the Navajo Generating Plant, and the work of the Western Regional Air Partnership, of which Utah is a member, should have beneficial effects on air quality in the region in the future.

Growth could bring adverse effects on water quality. Community water supplies may have to be upgraded to accommodate growth. Waste water treatment facilities may likewise have to be upgraded to protect both groundwater quality and water quality in streams associated with the communities, if those communities outgrow their current systems.

The current water quality problems identified in the Escalante and Paria river systems are not related to the communities, and would not be effected by community growth. In parts of the Escalante river, cadmium, selenium, phosphorous and silver exceed state standards. In parts of the Paria river system, total dissolved solids, turbidity, phosphorous and lead exceed state standards. It is thought that the source of these problems is the geologic parent material in the river basins, and to naturally high levels of erosion and transportation of this material with runoff.

Much of the land in the region is contained within National Parks, National Forests, a National Recreation Area, and National Monuments. Although this helps to preserve open space, it puts development pressure on the land available for development, and most of the available land is likely to be developed for housing, infrastructure needs, and commercial uses.

All of these factors, when combined with each of the management alternatives, could be expected to have cumulative impacts on the environment. The probable cumulative impacts are described, by alternative, below.

### **ALTERNATIVE A (NO ACTION)**

In the no action alternative, cross-country vehicle use would continue across much of the

Monument. As projected population growth and tourism growth occur, Monument visitation would also increase, since Alternative A has no provision for limiting visitation. The impacts of cross-country vehicle use would increase as visitation increased. The resulting surface disturbance could directly and indirectly impact all Monument resources, biological, geological, paleontological, archeological, and historic. Examples of impacts include the spread of weeds and the increasing risks of theft or damage to paleontological and archeological resources. It could also impact water quality and air quality from both fugitive dust and internal combustion engine waste products.

The increase in visitation would also impact all Monument resources, because of ground disturbance attributable to visitation, and because of the unrestricted access this alternative provides visitors. Access makes it more likely that visitors would damage or collect Monument resources. Unlike the other alternatives, Alternative A does not employ visitor allocations. Further, open access could significantly impact vegetation and other resources, and increase the risks of non-native plant species.

As regional population growth occurs, the associated air quality impacts could damage archeological, historic, biological and paleontological resources of the Monument.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

In conclusion, Alternative A, when coupled with the anticipated effects of population growth and growth in tourism, would have a high and ever-increasing level of environmental impact on Monument resources.

### ALTERNATIVES B, C, D, E

In Alternatives B, C, D, and E, cross-country vehicle travel is prohibited. This would have large beneficial effects on the environment, although it would reduce the range of activities available for visitors. The surface disturbance associated with cross-country vehicle travel, and the air and water quality problems that result, would not occur in these alternatives. The beneficial effects are similar across Alternatives B, C, D, and E.

In Alternatives B, C, D, and E, vehicles may only travel on routes that are designated open. The alternatives vary in the number of miles of routes that would be designated open. More miles of routes open would result in greater impacts to some resources, because of their accessibility to visitors. More route miles could also impact air and water quality through fugitive dust, and road-related erosion. Alternative E would designate 1,264 miles of routes open. Alternative C would designate 1,187 open, Alternative B would designate 818 miles open, and Alternative D would designate 760. The level of impact is

related not only to the number of miles open, but to the level of use the routes would receive and the type of resources subjected to increased risks. Alternatives B, C, D, and E would allow limitations to be placed on visitation, so the levels of use of the routes could be restricted if necessary.

As population and tourism grow, visitation pressure on the Monument would increase. Increased visitation would impact all Monument resources, and would impact, among other things, water quality, air quality, and the visitor experience. Those effects could be prevented or reduced in Alternatives B, C, D, and E by the imposition of the use limits each alternative allows. In addition, inventory and monitoring efforts would be undertaken in the more accessible zones in each alternative, and mitigation and adaptive measures would be implemented consistent with their results. These impacts could to some extent either counteract or reinforce the impacts of other proposed actions on Monument resources.

As regional population growth occurs, the associated air quality impacts could damage archeological, historic, biological and paleontological resources of the Monument. However, air quality is not projected to become a problem in the next 15 years, which is the time frame covered by this plan.

Water quality and water availability could also become problems as a result of growth, if community water supplies and waste-water treatment systems do not keep up with the increasing need. The approach to resolving water-related issues described in Chapter 2, Management Common to All Alternatives, would mitigate or prevent some water-related problems. Water quality monitoring, which is part of Alternatives B, D, and E, would detect water quality degradation, making it possible to work in cooperation with communities, the State of Utah, and adjacent land managers to resolve water quality problems.

Two utility line projects (the upgrade of Pacificorps Cottonwood Canyon power line from 230 kilovolt to 345 kilovolt, and the Lake Powell to Sand Hollow Reservoir water pipeline) have been proposed for future development within the Monument. The timing and exact specifications for both of these projects are uncertain. It is expected that the upgrade of the Cottonwood Canyon powerline could be done with minimal, if any, individual and cumulative impact in all alternatives because the upgrade would only require a permit to increase the voltage running through the powerline. No new structures or installations are expected to be needed for this upgrade.

The specifications and route of the proposed water pipeline between Sand Hollow

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

Reservoir and Lake Powell are less certain. If the pipeline were built within the existing rights-of-way along Highway 89, and given adequate clearances and mitigation to protect Monument resources, individual and cumulative impacts of the project could be minimal. If the pipeline is proposed to be constructed outside of the Highway 89 rights-of-way and outside of the more intensive zone that encompass that rights-of-way in each alternative, then the impacts to Monument resources could be much greater. Cumulative impacts of the surface disturbance associated with the pipeline combined with other surface disturbing activities (such as livestock grazing and recreational uses) in more remote zones could have greater impacts on visual quality, vegetation, archeology, and other resources. Given the lack of a detailed proposal for this pipeline, it is difficult to ascertain the exact impacts by alternative. In any case, subsequent National Environmental Policy Act analysis would be required at the time a proposal for the pipeline is submitted.

Alternatives B, C, D, and E would have some impacts on adjacent land management. Growing visitation, coupled with the lack of visitor facilities within the Monument, could increase visitation and demand for facilities outside the Monument. While this could be an economic benefit to communities, it could adversely effect adjacent public lands, or

necessitate more intensive management of people there. Alternative D, which generally would place the most restrictions on visitor use in the Monument (i.e., the most acreage with group size limits and allocations, the least designated open roads for motorized travel) could have the most significant impacts on adjacent jurisdictions by directing visitation to them.

The restrictions in all alternatives on cross-country vehicle travel could also impact adjacent lands, if cross-country vehicle use there increased as a result. Adjacent National Park Service and United States Forest Service lands would not be affected, since cross-country vehicle use is prohibited there. Adjacent BLM lands could be impacted by increased cross-country vehicle use, reflecting user demands that are redirected from the Monument.

The alternatives vary in their economic impacts to communities surrounding the Monument. Alternative E would bring the largest growth in visitation, with a projected 25 percent increase compared to the No Action Alternative. Alternative B would bring a small increase in visitation, with a projected increase of 6.7 percent compared to Alternative A, while both Alternatives C and D would bring decreases in visitation of 13.6 percent and 40 percent, respectively. Since some of the alternatives project modest increases in visitation compared

to baseline projections, adjacent communities may be affected through greater demand for services and infrastructure.

None of the alternatives would have a substantial impact on regional population. Employment would increase the most in Alternative E, followed by Alternative A, then by Alternatives B and C. Alternative D is projected to have a slight decrease in employment. Net revenues to local governments would be greatest in Alternative E, with \$330,000 in 2012, followed by Alternative B (\$236,000 by 2012), then by Alternative A (\$199,000 by 2012). This would be followed by Alternative C (\$43,000 by 2012), and Alternative D, with a net revenue deficit of \$36,000 by 2012.

All proposed management alternatives are driven by a basic intent to keep most of the landscape in its current condition, with very little new development expected within the Monument. The steady operating budget, constant employee base, and fixed facility locations result in little variation between alternatives and over time. Overall, the impacts of the management alternatives are small. Impacts to local government revenues and expenditures are also relatively small.

Some impacts to the communities, and cumulative impacts to the environment, are directly related to local and regional growth.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

None of the alternatives would have a significant effect on regional growth, and the effects of any alternative on local population growth are relatively small.

In conclusion, Alternative A, when considered cumulatively with past, present or reasonably foreseeable future actions, would have a marked impact on the environment, including on Monument resources. Implementation of any of Alternatives B, C, D, and E would have substantially less impact. The degree of actual impact that would occur as a result of each alternative would depend, in part, on application of use limits to control visitor use. Assuming those limits were consistently applied among alternatives, Alternative D would have the least impact, followed very closely by Alternative B. Alternatives C and E would have substantially more impact than either D or B, both on the Monument and on the human environment generally.

### **Irreversible and Irrecoverable Commitment of Resources**

The implementation of actions in accordance with the preferred alternative (Alternative B) is not likely to result in significant impacts that may be characterized as irreversible and irretrievable commitments. However, some small-scale disruption to resources may

occur, which may in turn prove long term or permanent. These are most likely to be associated with the preferred alternative's concentration of visitation in the Frontcountry zones along several major roads (Highways 12 & 89, and the Burr Trail). Provisions for visitor experience (including day-use) such as trails, overlooks and interpretive sites could yield irreparable impacts on resources such as cryptobiotic soils. Similarly, increased visitor access in the Frontcountry and Passage Zones could increase the risk of spreading non-native plants and disrupt the habitat of certain species. Impacts would be monitored to determine the extent to which they may prove irreversible and irreparable, and adaptive management would be employed as appropriate. Further, it is important to note that the risk of such impacts under the preferred alternative is notably less than current management (Alternative A).

### **Issues Considered but not Analyzed by Alternative**

There are several factors that must be considered in all Environmental Impact Statements because of laws, regulations, and executive orders, but which are not necessarily analyzed by alternative. They are discussed below.

### **IMPACTS ON AREAS OF CRITICAL ENVIRONMENTAL CONCERN**

There are no existing Areas of Critical Environmental Concern in the Monument. Therefore, there would be no impact on the relevance and importance criteria for any areas of critical environmental concern.

### **IMPACTS ON PRIME AND UNIQUE FARMLANDS**

There are no prime or unique farmlands, or farmland of statewide or local importance on public lands in the Monument. None of the actions anticipated with the alternatives analyzed in detail would disturb farmlands. Therefore, impacts on prime and unique farmlands are not analyzed further in this EIS.

### **IMPACTS ON FLOODPLAINS**

There are no floodplains associated with large rivers in the Monument. No projects or activities that would result in permanent fills or diversions in, or placement of permanent facilities on active floodplains of major rivers are projected to occur with implementation of any of the alternatives analyzed in detail. Therefore, impacts on floodplains are not analyzed in detail.

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

### **IMPACTS ON GEOLOGICAL RESOURCES**

Specific impacts on geological resources are not identified. This is because impacts on geology are difficult to separate from impacts to other resources which the geology of the Monument supports. Thus, impacts on geology are discussed elsewhere, either implicitly or explicitly, in the discussions of impacts to other resources such as paleontology and scenic quality.

### **IMPACTS ON OR FROM HAZARDOUS AND SOLID WASTES**

No hazardous, toxic, or unapproved solid waste sites are known to occur on public lands in the Monument. None of the actions, activities, and uses projected to occur with implementation of the plan alternatives would require the handling, storage, or release of large quantities of these wastes. Therefore, impacts on or from hazardous and solid wastes is not analyzed in detail.

### **IMPACTS ON NATIVE AMERICAN TRUST RIGHTS**

Impacts on Native American Trust Rights are not analyzed in detail in this Environmental Impact Statement because no trust rights are associated with lands inside the Monument. As described in Chapter 2, under

Management Common to All Alternatives, the BLM would consult with tribes in order to minimize impacts on ancestral sites and traditionally associated resources.

### **IMPACTS ON ENVIRONMENTAL JUSTICE**

The local communities in and around the Monument are typically below the State average per capita annual income of approximately \$17,000 and are almost exclusively Caucasian. For example, the percentage of Caucasian people in Garfield county is about 98 percent. The implementation of any of the plan alternatives would have a greater effect on the well-being of the local low income populations than on the more affluent populations in other areas of the State and country. However, because the affected local communities are homogenous and would be uniformly affected, there would not be an unequal distribution of risks and benefits in those communities from implementation of a Monument Management Plan.

Native American Indian populations would not be disproportionately affected by any of the plan alternatives. Exceptions to restrictions on uses of plants, collection of natural resources and access to certain locations would be granted for Native American Traditional practices.

### **IMPACTS OF VALID EXISTING RIGHTS AND STATE AND PRIVATE LANDS ON MONUMENT RESOURCES AND MANAGEMENT**

The effects of valid existing rights on public lands and potential uses of in-held state and private lands are not analyzed in detail in this EIS for reasons similar to those explained in Chapter 2 for the Full Field Mineral Development. Valid existing rights are described in Chapter 2, under Management Common To All Alternatives. Refer to the Cumulative Impacts section in Chapter 4 for more discussion of impacts of current operations.

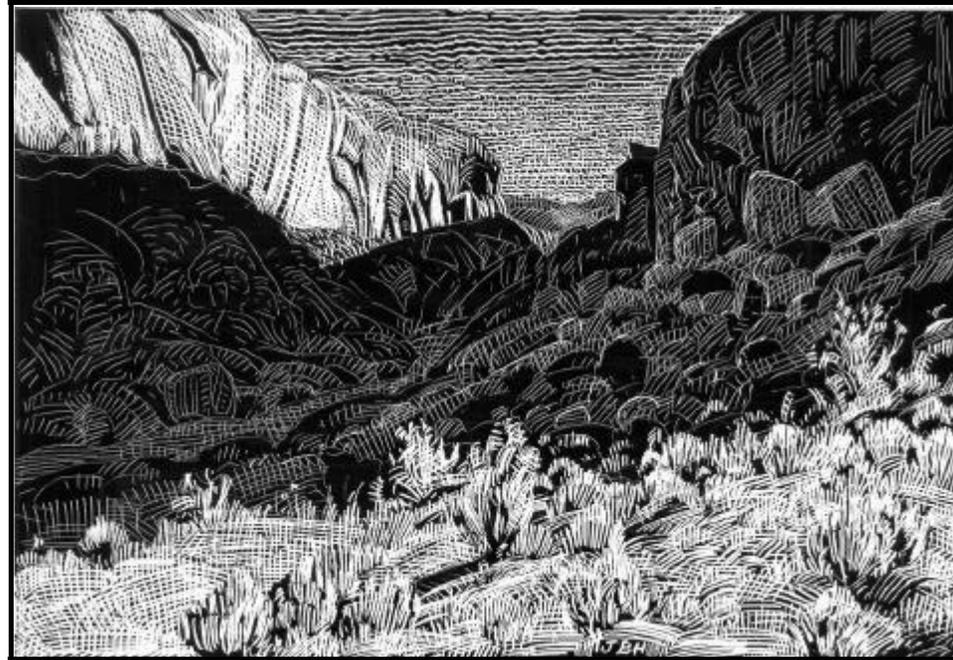
If the Utah land exchange covered by the May 8, 1998, Agreement between the United States and the State of Utah should become law, it would simply consolidate administration of all state and Federal mineral leases and should have little practical effect on the lessees, because the leased state lands are surrounded by leased Federal lands held by the same companies. Moreover, while Federal laws and regulations may be applicable to Federal actions on the newly acquired Federal land, the application of these laws and regulations must respect the valid existing rights of the lessees. From a practical standpoint, such laws and regulations would probably apply in some fashion already to activities on those state inholdings. For

## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

example, most mineral activity on state land within the Monument requires access across Federal land or activity on Federal leases to which Federal laws and regulations triggered by Federal action apply. For that reason, a change in land ownership would not significantly alter applicable regulatory authority or have impacts beyond those analyzed in this plan, and is therefore not analyzed by alternative.



## CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES



## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

**TABLE 4.1  
SUMMARY OF ENVIRONMENTAL CONSEQUENCES**

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<b>Impacts on paleontological resources</b>	<p>Paleontological resources could be affected in this alternative more so than in Alternatives B, C, D, or E, as it affords the least amount of visitor management options.</p> <p>Most of the degrading impacts would result from few restrictions on motorized and mechanized cross-country travel.</p> <p>Up to 8 acres could be disturbed by reasonably foreseeable actions. Impacts to paleontological resources would be mitigated prior to any ground disturbing activity.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Paleontological resources would be protected by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 34 acres could be disturbed by reasonably foreseeable actions. Impacts to paleontological resources would be mitigated prior to any ground disturbing activity.</p> <p>Impacts to paleontological resources would be mitigated through visitor number limitations on 1,571,162 acres.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Paleontological resources would be protected by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Impacts to paleontological resources would be mitigated prior to any ground disturbing activity.</p> <p>Impacts to paleontological resources would be mitigated through visitor number limitations on 1,684,899 acres.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Paleontological resources would be protected by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Impacts to paleontological resources would be mitigated prior to any ground disturbing activity.</p> <p>Impacts to paleontological resources would be mitigated through visitor number limitations on 1,684,899 acres.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Paleontological resources would be protected by closing the Monument to cross-country motorized and mechanized use (1,264) miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 43 acres could be disturbed by reasonably foreseeable actions. Impacts to paleontological resources would be mitigated prior to any ground disturbing activity.</p> <p>Impacts to paleontological resources would be mitigated through visitor number limitations on 1,466,541 acres.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on archaeological and historic resources</b></p>	<p>Archaeological and historic resources could be impacted in this alternative more so than in the other alternatives, as it affords the fewest visitor management options.</p> <p>Most of the degrading impacts would result from motorized and mechanized cross-country travel.</p> <p>Up to 8 acres could be disturbed by reasonably foreseeable actions. Impacts would be mitigated during any ground disturbing activity.</p> <p>No limits on group sizes could also result in degradation of cultural and historic resources.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Archaeological and historic resources would be protected by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 34 acres could be disturbed by reasonably foreseeable actions. Impacts would be mitigated during any ground disturbing activity.</p> <p>Impacts to archaeological and historic resources from visitation increases would be partially mitigated through group size (on 1,541,025 acres) and visitor number limitations (on 1,571,162 acres).</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Archaeological and historic resources would be protected by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Impacts would be mitigated prior to any ground disturbing activity.</p> <p>Impacts to archaeological and historic resources from visitation increases would be partially mitigated through group size (on 972,364 acres) and visitor number limitations (on 1,684,899 acres).</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Archaeological and historic resources would be protected by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Impacts would be mitigated prior to any ground disturbing activity.</p> <p>Impacts to archaeological and historic resources from visitation increases would be partially mitigated through group size (on 1,571,085 acres) and visitor number limitations (on 1,684,899 acres).</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Archaeological and historic resources would be protected by closing the Monument to cross-country motorized and mechanized use (1,264 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 43 acres could be disturbed by reasonably foreseeable actions. Impacts would be mitigated prior to any ground disturbing activity.</p> <p>Impacts to archaeological and historic resources from visitation increases would be partially mitigated through group size (on 1,466,541 acres) and visitor number limitations (on 1,466,541 acres).</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impact from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on vegetation</b></p>	<p>Vegetation could be impacted by this alternative to a much greater degree because it lacks restrictions on cross-country vehicle use.</p> <p>Up to 8 acres could be disturbed by reasonably foreseeable actions.</p> <p>The potential for impacts to vegetation from increases in visitation would be likely because of no use allocations.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Vegetation would be protected by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>Limiting the network of maintained routes and restrictions on equipment to suppress wildfires would prevent impacts to vegetation from surfacing activities. Because of these limitations more vegetation could be burned.</p> <p>Up to 34 acres could be disturbed by reasonably foreseeable actions.</p> <p>Impacts to vegetation from increases in visitation would be partially mitigated through group size (on 1,541,025 acres) and visitor number limitations (on 1,571,162 acres).</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Vegetation would be protected by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>Limiting the network of maintained routes and restrictions on equipment to suppress wildfires would prevent impacts to vegetation from surfacing activities. Because of these limitations more vegetation could be burned.</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions.</p> <p>Impacts to vegetation from increases in visitation would be partially mitigated through group size (on 972,364 acres) and visitor number limitations (on 1,684,899 acres).</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Vegetation would be protected by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>Limiting the network of maintained routes and restrictions on equipment to suppress wildfires would prevent impacts to vegetation from surfacing activities. Because of these limitations more vegetation could be burned.</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions.</p> <p>Impacts to vegetation from visitation increases would be partially mitigated through group size (on 1,571,085 acres) and visitor number limitations (on 1,684,899 acres).</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Vegetation would be protected by closing the Monument to cross-country motorized and mechanized use (1,264 miles of designated routes would be open to motorized and mechanized use).</p> <p>Limiting the network of maintained routes and restrictions on equipment to suppress wildfires would prevent impacts to vegetation from surfacing activities. Because of these limitations more vegetation could be burned.</p> <p>Up to 43 acres could be disturbed by reasonably foreseeable actions.</p> <p>Impacts to vegetation from visitation increases would be partially mitigated through group size (on 1,466,541 acres) and visitor number limitations (on 1,466,541 acres).</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on threatened and endangered plant species</b></p>	<p>Impacts to 1,691 acres of known Jones' Cycladenia populations and habitat and 2,851 acres of Kodachrome bladderpod populations and habitat could occur from off-highway vehicle travel. Ute ladies'-tresses populations and habitat (64 acres) were closed to off-highway vehicle travel.</p> <p>There would be no significant impacts to Kodachrome bladderpod and Jones' Cycladenia from increased visitor use. Impacts to Ute ladies'-tresses populations and habitat could occur from unregulated visitor use.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses would be mitigated.</p>	<p>Closing the Monument to cross-country motorized and mechanized use would afford substantial protection to threatened and endangered plant populations and their habitats.</p> <p>Surveys for threatened or endangered plants would be conducted before any ground disturbing activities could occur.</p> <p>Group size restrictions and allocations could reduce impacts from day-use activities on Ute ladies'-tresses.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses would be mitigated.</p>	<p>Closing the Monument to cross-country motorized and mechanized use would afford substantial protection to threatened and endangered plant populations and their habitats.</p> <p>Surveys for threatened or endangered plants would be conducted before any ground disturbing activities could occur.</p> <p>Group size restrictions and allocations could reduce impacts from day-use activities on Ute ladies'-tresses.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses would be mitigated.</p>	<p>Closing the Monument to cross-country motorized and mechanized use would afford substantial protection to threatened and endangered plant populations and their habitats.</p> <p>Surveys for threatened or endangered plants would be conducted before any ground disturbing activities could occur.</p> <p>Group size restrictions and allocations could reduce impacts from day-use activities on Ute ladies'-tresses.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses would be mitigated.</p>	<p>Closing the Monument to cross-country motorized and mechanized use would afford substantial protection to threatened and endangered plant populations and their habitats.</p> <p>Surveys for threatened or endangered plants would be conducted before any ground disturbing activities could occur.</p> <p>Group size restrictions and allocations could reduce impacts from day-use activities on Ute ladies'-tresses.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<b>Impacts on relict vegetation</b>	<p>Most relict vegetation would not be protected from cross-country vehicle travel, although it is unlikely that these areas would be receive any use. Unrestricted use by visitors has the potential to impact these communities. No visitor facilities would be constructed in these areas.</p> <p>Adverse impacts from research uses would be mitigated.</p>	<p>Relict vegetation would be protected by closing the Monument to cross-country motorized and mechanized use, limiting group size and numbers of people, and by not allowing any facility developments in these areas.</p> <p>Adverse impacts from research uses would be mitigated.</p>	<p>Relict vegetation would be protected by closing the Monument to cross-country motorized and mechanized use, limiting group size and numbers of people, and by not allowing any facility developments in these areas.</p> <p>Adverse impacts from research uses would be mitigated.</p>	<p>Relict vegetation would be protected by closing the Monument to cross-country motorized and mechanized use, limiting group size and numbers of people, and by not allowing any facility developments in these areas.</p> <p>Adverse impacts from research uses would be mitigated.</p>	<p>Relict vegetation would be protected by closing the Monument to cross-country motorized and mechanized use, limiting group size and numbers of people, and by not allowing any facility developments in these areas.</p> <p>Adverse impacts from research uses would be mitigated.</p>
<b>Impacts on riparian resources</b>	<p>Impacts could occur in riparian areas from the lack of restrictions on visitor use.</p> <p>Riparian resources could be impacted by cross-country vehicle travel.</p> <p>None of the reasonably foreseeable actions for visitor site facility construction would be allowed in riparian areas.</p> <p>The lack of group size limits and other visitor allocations could continue to adversely impact some riparian resources.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Riparian resources would be protected by closing the Monument to cross-country motorized and mechanized use.</p> <p>None of the reasonably foreseeable actions for visitor site facility construction would be allowed in riparian areas.</p> <p>Group size limits and other allocations would help reduce impacts from people on riparian resources.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Riparian resources would be protected by closing the Monument to cross-country motorized and mechanized use.</p> <p>None of the reasonably foreseeable actions for visitor site facility construction would be allowed in riparian areas.</p> <p>Group size limits and other allocations would help reduce impacts from people on riparian resources.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Riparian resources would be protected by closing the Monument to cross-country motorized and mechanized use.</p> <p>None of the reasonably foreseeable actions for visitor site facility construction would be allowed in riparian areas.</p> <p>Group size limits and other allocations would help reduce impacts from people on riparian resources.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Riparian resources would be protected by closing the Monument to cross-country motorized and mechanized use.</p> <p>None of the reasonably foreseeable actions for visitor site facility construction would be allowed in riparian areas.</p> <p>Group size limits and other allocations would help reduce impacts from people on riparian resources.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<b>Impacts of weeds</b>	<p>This alternative would have the greatest potential for the spread of weeds. In part because much of the Monument would remain open to cross-country vehicle travel.</p> <p>Up to 8 acres could be disturbed by reasonably foreseeable actions. Appropriate mitigation would prevent the spread of weeds in areas with surface disturbance.</p> <p>Impacts that could lead to the spread of weeds due to increased visitation could occur because no limitations would be applied.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Weed dispersal would be minimized by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 34 acres could be disturbed by reasonably foreseeable actions. Appropriate mitigation would prevent the spread of weeds in areas with surface disturbance.</p> <p>Impacts that could lead to the spread of weeds due to increased visitation would be partially mitigated through limitations on group size and visitor use allocations.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Weed dispersal would be minimized by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Appropriate mitigation would prevent the spread of weeds in areas with surface disturbance.</p> <p>Impacts that could lead to the spread of weeds due to increased visitation would be partially mitigated through limitations on group size and visitor use allocations.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Weed dispersal would be minimized by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Appropriate mitigation would prevent the spread of weeds in areas with surface disturbance.</p> <p>Impacts that could lead to the spread of weeds due to increased visitation would be partially mitigated through limitations on group size and visitor use allocations.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Weed dispersal would be minimized by closing the Monument to cross-country motorized and mechanized use (1,264 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 43 acres could be disturbed by reasonably foreseeable actions. Appropriate mitigation would prevent the spread of weeds in areas with surface disturbance.</p> <p>Impacts that could lead to the spread of weeds due to increased visitation would be partially mitigated through limitations on group size and visitor use allocations.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on cryptobiotic soils</b></p>	<p>Impacts to cryptobiotic soils would come from unregulated cross-country vehicle travel.</p> <p>Up to 8 acres could be disturbed by reasonably foreseeable actions. Every effort would be made to prevent any disturbance to cryptobiotic soils during any ground disturbing activity.</p> <p>Impacts to cryptobiotic soils could come from unregulated visitor use.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Cryptobiotic soils would be protected by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 34 acres could be disturbed by reasonably foreseeable actions. Every effort would be made to prevent any disturbance to cryptobiotic soils during any ground disturbing activity.</p> <p>Impacts to cryptobiotic soils due to increased visitation would be partially mitigated through limitations on group size and visitor use allocations.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Cryptobiotic soils would be protected by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Every effort would be made to prevent any disturbance to cryptobiotic soils during any ground disturbing activity.</p> <p>Impacts to cryptobiotic soils due to increased visitation would be partially mitigated through limitations on group size and visitor use allocations.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Cryptobiotic soils would be protected by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Every effort would be made to prevent any disturbance to cryptobiotic soils during any ground disturbing activity.</p> <p>Impacts to cryptobiotic soils due to increased visitation would be partially mitigated through limitations on group size and visitor use allocations.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Cryptobiotic soils would be protected by closing the Monument to cross-country motorized and mechanized use (1,264 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 43 acres could be disturbed by reasonably foreseeable actions. Every effort would be made to prevent any disturbance to cryptobiotic soils during any ground disturbing activity.</p> <p>Impacts to cryptobiotic soils due to increased visitation would be partially mitigated through limitations on group size and visitor use allocations.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on wildlife</b></p>	<p>Impacts to wildlife would occur from increased interactions with humans and potential habitat degradation from continued cross-country vehicle use.</p> <p>Up to 8 acres could be disturbed by reasonably foreseeable actions. If present on the specific site, there would be a short term impact to wildlife during site construction.</p> <p>Increased visitation with no group limits or allocations could impact wildlife.</p> <p>Animal damage control activities would directly impact targeted wildlife species.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Wildlife would be protected by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 34 acres could be disturbed by reasonably foreseeable actions. If present on the specific site, there would be a short term impact to wildlife during site construction. Every effort would be made to minimized any short term impacts to wildlife during any ground disturbing activity.</p> <p>Group size limits and other allocations would help reduce impacts from people on wildlife.</p> <p>Animal damage control efforts would impact targeted wildlife populations only after other means of control have been exhausted.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Wildlife would be protected by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. If present on the specific site, there would be a short term impact to wildlife during site construction. Every effort would be made to minimized any short term impacts to wildlife during any ground disturbing activity.</p> <p>Group size limits and other allocations would help reduce impacts from people on wildlife.</p> <p>Animal damage control efforts would impact targeted willife populations only after other means of control have been exhausted.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Wildlife would be protected by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. If present on the specific site, there would be a short term impact to wildlife during site construction. Every effort would be made to minimized any short term impacts to wildlife during any ground disturbing activity.</p> <p>Group size limits and other allocations would help reduce impacts from people on wildlife.</p> <p>Animal damage control activities would not be allowed reducing impacts on wildlife populations that would otherwise be targeted.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Wildlife would be protected by closing the Monument to cross-country motorized and mechanized use (1,264 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 43 acres could be disturbed by reasonably foreseeable actions. If present on the specific site, there would be a short term impact to wildlife during site construction. Every effort would be made to minimized any short term impacts to wildlife during any ground disturbing activity.</p> <p>Group size limits and other allocations would help reduce impacts from people on wildlife.</p> <p>Animal damage control efforts would impact targeted wildlife populations except where they conflict with management objectives for visitor use or fish and wildlife.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on threatened and endangered animal species</b></p>	<p>There are currently no known conflicts with threatened or endangered animal species.</p> <p>Lack of cross-country vehicle travel restrictions could allow the potential for impacts to threatened and endangered animal species.</p> <p>Up to 8 acres could be disturbed by reasonably foreseeable actions. It is not anticipated that this disturbance would occur in areas where threatened or endangered animal species occur. Clearances would be conducted prior to construction. If species were present, no construction would be allowed.</p> <p>If increased visitation were found to have impacts on threatened or endangered species, measures would be taken to protect the species.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Threatened and endangered animal species would be protected by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 34 acres could be disturbed by reasonably foreseeable actions. It is not anticipated that this disturbance would occur in areas where threatened or endangered animal species occur. Clearances would be conducted prior to construction. If species were present, no construction would be allowed.</p> <p>Group size limits and other allocations would help reduce interactions between people and threatened and endangered animal species.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Threatened and endangered animal species would be protected by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. It is not anticipated that this disturbance would occur in areas where threatened or endangered animal species occur. Clearances would be conducted prior to construction. If species were present, no construction would be allowed.</p> <p>Group size limits and other allocations would help reduce interactions between people and threatened and endangered animal species.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Threatened and endangered animal species would be protected by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. It is not anticipated that this disturbance would occur in areas where threatened or endangered animal species occur. Clearances would be conducted prior to construction. If species were present, no construction would be allowed.</p> <p>Group size limits and other allocations would help reduce interactions between people and threatened and endangered animal species.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Threatened and endangered animal species would be protected by closing the Monument to cross-country motorized and mechanized use (1,264 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 43 acres could be disturbed by reasonably foreseeable actions. It is not anticipated that this disturbance would occur in areas where threatened or endangered animal species occur. Clearances would be conducted prior to construction. If species were present, no construction would be allowed.</p> <p>Group size limits and other allocations would help reduce interactions between people and threatened and endangered animal species.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on the Paunsaugunt deer herd</b></p>	<p>Much of the Paunsaugunt deer herd habitat would remain open to cross-country vehicle travel, increasing access into the area. This could result in deer being subjected to human interference and physiological stress during their most biologically sensitive periods.</p> <p>Construction of visitor facilities would be minimal. Use in the herd area is expected to remain low.</p>	<p>Cross-country vehicle travel would be prohibited in the herd area. The area would be accessible for certain types of vehicles on designated routes.</p> <p>The construction of visitor facilities could cause some short-term stress related effects during construction and could destroy a small amount of habitat.</p>	<p>Cross-country vehicle travel would be prohibited in the herd area. The area would be accessible for certain types of vehicles on designated routes.</p> <p>The construction of visitor facilities could cause some short-term stress related effects during construction and could destroy a small amount of habitat.</p>	<p>Cross-country vehicle travel would be prohibited in the herd area. The area would be accessible for certain types of vehicles on designated routes.</p> <p>The construction of visitor facilities could cause some short-term stress related effects during construction and could destroy a small amount of habitat.</p>	<p>Cross-country vehicle travel would be prohibited in the herd area. The area would be accessible for certain types of vehicles on designated routes.</p> <p>The construction of visitor facilities could cause some short-term stress related effects during construction and could destroy a small amount of habitat.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on surface water quality</b></p>	<p>Lack of cross-country vehicle travel restrictions would allow potential impacts to surface water quality to continue.</p> <p>Up to 8 acres could be disturbed by reasonably foreseeable actions. It is anticipated that impacts from this disturbance would be minimal. Facilities would be constructed in a manner that sediment or other contaminants would not be introduced into water sources.</p> <p>Increases in unregulated visitation would add to surface water quality impacts.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Surface water quality would be protected by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 34 acres could be disturbed by reasonably foreseeable actions. It is anticipated that impacts from this disturbance would be minimal. Facilities would be constructed in such a manner that sediment or other contaminants would not be introduced into water sources.</p> <p>Group size limits and other allocations would help reduce impacts.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Surface water quality would be protected by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. It is anticipated that impacts from this disturbance would be minimal. Facilities would be constructed in such a manner that sediment or other contaminants would not be introduced into water sources.</p> <p>Group size limits and other allocations would help reduce impacts.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Surface water quality would be protected by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. It is anticipated that impacts from this disturbance would be minimal. Facilities would be constructed in such a manner that sediment or other contaminants would not be introduced into water sources.</p> <p>Group size limits and other allocations would help reduce impacts.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Surface water quality would be protected by closing the Monument to cross-country motorized and mechanized use (1,264 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 43 acres could be disturbed by reasonably foreseeable actions. It is anticipated that impacts from this disturbance would be minimal. Facilities would be constructed in such a manner that sediment or other contaminants would not be introduced into water sources.</p> <p>Group size limits and other allocations would help reduce impacts.</p> <p>The effects of grazing would be assessed and, if impacts were found, adaptive management measures could be implemented.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on air quality</b></p>	<p>Continue PSD Class II air quality designation. The presence of Class I areas surrounding the Monument could effectively limit air quality deterioration.</p> <p>The anticipated levels of construction and vehicle use on unpaved routes would result in localized increases in fugitive dust that would be temporary and would not exceed air quality standards.</p>	<p>Continue PSD Class II air quality designation. The presence of Class I areas surrounding the Monument could effectively limit air quality deterioration.</p> <p>The anticipated levels of construction and vehicle use on unpaved routes would result in localized increases in fugitive dust that would be temporary and would not exceed air quality standards.</p>	<p>Continue PSD Class II air quality designation. The presence of Class I areas surrounding the Monument could effectively limit air quality deterioration.</p> <p>The anticipated levels of construction and vehicle use on unpaved routes would result in localized increases in fugitive dust that would be temporary and would not exceed air quality standards.</p>	<p>BLM would pursue a PSD Class I air quality redesignation for the Monument. This would provide long-term air quality protection for the Monument, although the presence of Class I areas surrounding the Monument could have the same effect.</p> <p>The anticipated levels of construction and vehicle use on unpaved routes would result in localized increases in fugitive dust that would be temporary and would not exceed air quality standards.</p>	<p>Continue PSD Class II air quality designation. The presence of Class I areas surrounding the Monument could effectively limit air quality deterioration.</p> <p>The anticipated levels of construction and vehicle use on unpaved routes would result in localized increases in fugitive dust that would be temporary and would not exceed air quality standards.</p>
<p><b>Impacts on wild and scenic river values</b></p>	<p>A determination for suitability on the 25 eligible river segments (330 miles) would not be made. The segments would not be recommended to congress for designation into the NWSRS and would not receive the degree of protection that designation would provide. Protective management would continue indefinitely.</p>	<p>17 (252 miles) of the 25 eligible river segments would be determined suitable for recommendation to Congress for designation into the NWSRS. There would be no adverse impacts from planned actions anticipated for any segments determined suitable. The suitable segments would be managed for the preservation of the outstandingly remarkable values, under the direction of the plan. The 8 segments determined unsuitable would be managed under the direction and prescriptions of the plan.</p>	<p>All 25 of the eligible river segments (330 miles) would be determined unsuitable. The segments would not be recommended to congress for designation into the NWSRS and would not receive the degree of protection that designation would provide. The 25 segments determined unsuitable would be managed under the direction and prescriptions of the plan.</p>	<p>All 25 eligible river segments (330 miles) would be determined suitable for recommendation to Congress for designation into the NWSRS. There would be no adverse impacts from planned actions anticipated for any segments determined suitable. The suitable segments would be managed for the preservation of the outstandingly remarkable values, under the direction of the plan.</p>	<p>17 (252 miles) of the 25 eligible river segments would be determined suitable for recommendation to Congress for designation into the NWSRS. There would be no adverse impacts from planned actions anticipated for any segments determined suitable. The suitable segments would be managed for the preservation of the outstandingly remarkable values, under the direction of the plan. The 8 segments determined unsuitable would be managed under the direction and prescriptions of the plan.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on research activities</b></p>	<p>Provides the greatest access for research and the least protection for the research value of Monument resources.</p> <p>Animal damage control activities would impact some research related to wildlife populations and natural systems.</p>	<p>Research value of Monument resources would be protected by closing the Monument to cross-country motorized and mechanized use. A 1,047 mile network of designated public and administrative routes would be open to motorized and mechanized use.</p> <p>Animal damage control activities would impact some research related to wildlife populations and natural systems when other measures have been exhausted.</p>	<p>Research value of Monument resources would be protected by closing the Monument to cross-country motorized and mechanized use. A 1,367 mile network of designated public and administrative routes would be open to motorized and mechanized use.</p> <p>Animal damage control activities would impact some research related to wildlife populations and natural systems when other measures have been exhausted.</p>	<p>Research value of Monument resources would be protected by closing the Monument to cross-country motorized and mechanized use. A 790 mile network of designated public and administrative routes would be open to motorized and mechanized.</p> <p>Animal damage control activities would not be permitted.</p>	<p>Research value of Monument resources would be protected by closing the Monument to cross-country motorized and mechanized use. A 1,348 mile network of designated public and administrative routes would be open to motorized and mechanized use.</p> <p>Animal damage control activities would impact some research related to wildlife populations and natural systems except when such activities affect management objectives for visitor use or wildlife and fish.</p>
<p><b>Impacts on livestock operations</b></p>	<p>Cross-country motorized travel and access on existing routes would facilitate livestock management operations. Greater access to the general public could increase the chance of damage to range improvement or harassment of livestock.</p> <p>Construction of new water developments to protect Monument resources could also have a beneficial impact on livestock operations.</p> <p>Animal damage control activities could have a beneficial impact on livestock operations by removing animals known to have killed livestock.</p>	<p>Access would be reduced in this alternative as compared to the no action. Administrative and public access on designated routes would be 1,347 miles.</p> <p>Construction of new water developments to protect Monument resources could also facilitate achieving resource condition objectives for grazing.</p> <p>Animal damage control activities could have a beneficial impact on livestock operations by removing animals known to have killed livestock.</p>	<p>Access would be reduced in this alternative as compared to the no action. Administrative and public access on designated routes would be 1,367 miles.</p> <p>Construction of new water developments to protect Monument resources could also facilitate achieving resource condition objectives for grazing.</p> <p>Animal damage control activities could have a beneficial impact on livestock operations by removing animals known to have killed livestock.</p>	<p>Access would be reduced in this alternative as compared to the no action. Administrative and public access on designated routes would be 790 miles.</p> <p>Construction of new water developments would not be permitted, limiting the range of options available to livestock operators to achieve resource condition objectives.</p> <p>Animal damage control activities would not be permitted which could impact livestock operations by increasing predation losses.</p>	<p>Access would be reduced in this alternative as compared to the no action. Administrative and public access on designated routes would be 1,348 miles.</p> <p>Construction of new water developments for purpose of protecting Monument resources or to enhance management of livestock, wildlife, recreation or watershed resources could also facilitate achieving resource condition objectives.</p> <p>Animal damage control activities could have a beneficial impact on livestock operations by removing animals known to have killed livestock.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<b>Impacts on forestry product use</b>	Cross-country vehicle access would not be restricted in fuelwood collection areas, facilitating the collection of these products.	No cross-country vehicle access would be allowed, making it more difficult to easily access and collect these products.	No cross-country vehicle access would be allowed, making it more difficult to easily access and collect these products.	No cross-country vehicle access would be allowed, making it more difficult to easily access and collect these products.	No cross-country vehicle access would be allowed, making it more difficult to easily access and collect these products.
<b>Impacts on recreational use</b>	<p>This alternative would result in the greatest number of unrestricted uses, with the fewest developments to support these uses.</p> <p>Much of the Monument would remain open to cross-country vehicle travel. More routes would be open to travel in this alternative.</p> <p>Visitors would be accommodated in with the construction of 16 new visitor facilities.</p> <p>Crowding would likely occur in developed areas and on trails. Lack of group size limits would impact visitor experience due to the noise and visual impacts of large groups.</p> <p>Animal damage control activities would directly and indirectly impact visitor experiences.</p>	<p>Visitors would be provided with opportunities for both developed and primitive experiences with this alternative.</p> <p>Visitors would be able to experience the Monument on the 818 miles of designated routes would be open to motorized and mechanized use. ATV and dirt bike users would be accommodated on the 591 miles of the 818 miles that would be designated open for non-street legal ATV and dirt bike use. The Monument would be closed to cross-country motorized and mechanized use.</p> <p>Visitors would be accommodated in this alternative with the construction of 32 new visitor facilities.</p> <p>Group size limits and other allocations would help reduce potential overcrowding impacts from people.</p> <p>Animal damage control activities would directly and indirectly impact visitor experiences.</p>	<p>Visitors would be able to experience the Monument on the 1,187 miles of designated routes would be open to motorized and mechanized use. No routes would be designated for non-street legal ATV or dirt bike use. The Monument would be closed to cross-country motorized and mechanized use.</p> <p>Visitor experiences would be facilitated by the addition of 20 new visitor facilities.</p> <p>Group size limits and other allocations would help reduce potential overcrowding impacts from people.</p> <p>Animal damage control activities would directly and indirectly impact visitor experiences.</p>	<p>This alternative is the most restrictive, but would provide visitors with the greatest opportunities for primitive experiences.</p> <p>Visitors would be able to experience the Monument on the 760 miles of designated routes would be open to motorized and mechanized use. No routes would be designated for non-street legal ATV or dirt bike use. The Monument would be closed to cross-country motorized and mechanized use.</p> <p>Visitor experiences would be facilitated by the addition of 20 new visitor facilities.</p> <p>Group size limits and other allocations would help reduce potential overcrowding impacts from people.</p> <p>Animal damage control activities would directly and indirectly impact visitor experiences.</p>	<p>The widest range of visitor experiences would be afforded with this alternative.</p> <p>Visitors would be able to experience the Monument on the 1,264 miles of designated routes would be open to motorized and mechanized use. ATV and dirt bike users would be accommodated on the 980 miles of the 1,264 miles that would be designated open for non-street legal ATV and dirt bike use. The Monument would be closed to cross-country motorized and mechanized use.</p> <p>Visitors would be most accommodated in this alternative with the construction of 43 new visitor facilities.</p> <p>Group size limits and other allocations would help reduce potential overcrowding impacts from people.</p> <p>Animal damage control activities would directly and indirectly impact visitor experiences.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on outfitters and guides</b></p>	<p>Existing outfitters and guide permits would likely benefit the most from this alternative. Although they would not be able to expand their operations.</p>	<p>Outfitters and guides would benefit because they would be allowed to operate throughout the Monument.</p> <p>These users would be subject to the same restrictions and limitations as other users. The limitations include group size, allocations, and travel restrictions on designated routes.</p>	<p>Outfitters and guides would be allowed to operate throughout most of the Monument.</p> <p>These users would be subject to the same restrictions and limitations as other users. The limitations include group size, allocations, and travel restrictions on designated routes.</p>	<p>Outfitters and guides would be allowed to operate throughout the Monument.</p> <p>These users would be subject to the same restrictions and limitations as other users. The limitations include group size, allocations, and travel restrictions on designated routes.</p>	<p>Outfitters and guides would benefit because they would be allowed to operate throughout the Monument. This alternative provides the fewest restrictions.</p> <p>These users would be subject to the same restrictions and limitations as other users. The limitations include group size, allocations, and travel restrictions on designated routes.</p>
<p><b>Impacts on scenic quality</b></p>	<p>Continued cross-country vehicle use could create noticeable intrusions detracting from the scenic quality.</p> <p>Surface disturbance from construction of visitor facilities would be 8 acres. The visual resource contrast rating system would be used to decrease impacts.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Scenic quality would be protected by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 34 acres could be disturbed by reasonably foreseeable actions. Visitor facilities would be designed to mitigate impacts to visual resources and conform to the assigned visual resource management class objective.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Scenic quality would be protected by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Visitor facilities would be designed to mitigate impacts to visual resources and conform to the assigned visual resource management class objective.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Scenic quality would be protected by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 36 acres could be disturbed by reasonably foreseeable actions. Visitor facilities would be designed to mitigate impacts to visual resources and conform to the assigned visual resource management class objective.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Scenic quality would be protected by closing the Monument to cross-country motorized and mechanized use (1,264 miles of designated routes would be open to motorized and mechanized use).</p> <p>Up to 43 acres could be disturbed by reasonably foreseeable actions. Visitor facilities would be designed to mitigate impacts to visual resources and conform to the assigned visual resource management class objective.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<p><b>Impacts on primitive unconfined values</b></p>	<p>Lack of cross-country vehicle restrictions and unlimited access in this alternative would affect primitive unconfined values. Large portions of the Monument would not be protected from the sights and sounds of motorized and mechanized recreation.</p> <p>The construction of visitor site facilities could concentrate visitor use at the developed sites and reduce impacts on primitive and unconfined values in the rest of the Monument.</p> <p>Not limiting group size could increase impacts on naturalness if groups concentrate on trails and in campsites.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Primitive and unconfined values would be protected by closing the Monument to cross-country motorized and mechanized use (818 miles of designated routes would be open to motorized and mechanized use).</p> <p>The construction of visitor site facilities would focus visitor use in those areas, reducing impacts on primitive and unconfined values in the rest of the Monument.</p> <p>Group size limits and other allocations would help reduce impacts from people.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Primitive and unconfined values would be protected by closing the Monument to cross-country motorized and mechanized use (1,187 miles of designated routes would be open to motorized and mechanized use).</p> <p>The construction of visitor site facilities would focus visitor use in those areas, reducing impacts on primitive and unconfined values in the rest of the Monument.</p> <p>Group size limits and other allocations would help reduce impacts from people.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Primitive and unconfined values would be protected by closing the Monument to cross-country motorized and mechanized use (760 miles of designated routes would be open to motorized and mechanized use).</p> <p>The construction of visitor site facilities would focus visitor use in those areas, reducing impacts on primitive and unconfined values in the rest of the Monument.</p> <p>Group size limits and other allocations would help reduce impacts from people.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>	<p>Primitive and unconfined values would be protected by closing the Monument to cross-country motorized and mechanized use (1,264 miles of designated routes would be open to motorized and mechanized use).</p> <p>The construction of visitor site facilities would focus visitor use in those areas, reducing impacts on primitive and unconfined values in the rest of the Monument.</p> <p>Group size limits and other allocations would help reduce impacts from people.</p> <p>Adverse impacts from research uses and water developments would be mitigated.</p>

## CHAPTER 4 - SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
<b>Impacts on local economies</b>	<p>The annual growth rate in visitation would be 4.7 percent in this alternative, with 217,190 visitor days in 1998, growing to 414,764 visitor days in 2012. Regional population growth attributable to this alternative would be 370 people in 2012. By 2012, the additional employment generated by this alternative would be 219 jobs, with employee earnings reaching \$6,001,000 in that year. Local government revenues attributable to this alternative would be \$516,000 in 2012, with expenditures of \$317,000, for a net revenue of \$199,000 to local governments.</p>	<p>The annual growth in visitation in this alternative would be 5.2 percent, with 442,633 visitor days in 2012, 6.7 percent higher than Alternative A. Regional population growth attributable to this alternative would be 422 people in 2012, compared to 370 people in Alternative A. By 2012, the additional employment generated by this alternative would be 248 jobs, compared to 219 in Alternative A. Employee earnings would reach \$6,636,000 in 2012, 10.6 percent higher than Alternative A. Local government revenues attributable to this alternative would be \$ 598,000 in 2012, with expenditures of \$362,000, for a net revenue of \$236,000 to local governments, 18.6 percent higher than in Alternative A.</p>	<p>The annual growth in visitation in this alternative would be 3.7 percent, with 358,274 visitor days in 2012, 13.6 percent lower than Alternative A. Regional population growth attributable to this alternative would be 282 people in 2012, compared to 370 people in Alternative A. By 2012, the additional employment generated by this alternative would be 163 jobs, compared to 219 in Alternative A. Employee earnings would reach \$3,828,000 in 2012, 36 percent less than Alternative A. Local government revenues attributable to this alternative would be \$288,000 in 2012, with expenditures of \$245,000, for a net revenue of \$236,000 to local governments, 78 percent lower than in Alternative A.</p>	<p>The annual growth in visitation in this alternative would be 1.2 percent, with 248,055 visitor days in 2012, 40 percent lower than Alternative A. Regional population growth attributable to this alternative would be 6 people in 2012, compared to 370 people in Alternative A. By 2012, this alternative would show a net loss of 1 job, compared to an increase of 219 jobs in Alternative A. Employee earnings would reach \$1,480,000 in 2012, 75 percent less than Alternative A. Local government revenues attributable to this alternative in 2012 would be less than expenditures, for a net revenue deficit of \$36,000.</p>	<p>The annual growth in visitation in this alternative would be 6.3 percent, with 519,208 visitor days in 2012, 25 percent higher than Alternative A. Regional population growth attributable to this alternative would be 544 people in 2012, compared to 370 people in Alternative A. By 2012, the additional employment generated by this alternative would be 324 jobs, compared to 219 in Alternative A. Employee earnings would reach \$7,963,000 in 2012, 32.7 percent higher than Alternative A. Local government revenues attributable to this alternative would be \$792,000 in 2012, with expenditures of \$462,000, for a net revenue of \$330,000 to local governments, 65.8 percent higher than in Alternative A.</p>
<b>Cumulative Impacts</b>	<p>When coupled with the anticipated effects of population growth and growth in tourism, a high and ever-increasing level of environmental impact on Monument resources would occur.</p>	<p>Implementation of any of Alternatives B, C, D, or E would have substantially less impact than Alternative A. The degree of actual impact that would occur as a result of each alternative would depend, in part, on application of use limits to control visitor use. Assuming those limits were consistently applied among alternatives, Alternative D would have the least impact, followed by Alternative B. Alternatives C and E would have substantially more impact than either D or B, both on the Monument and on the human environment.</p>			