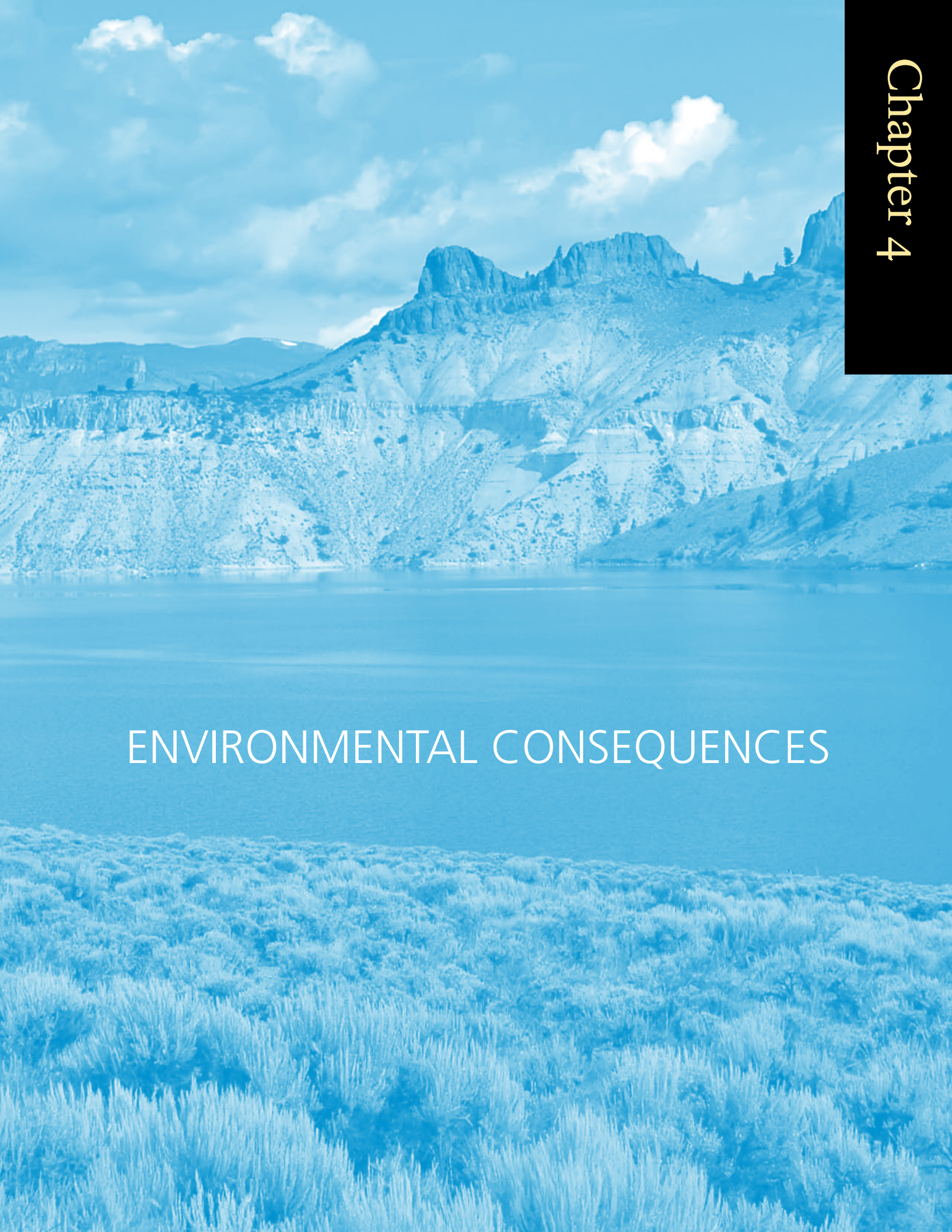

Chapter 4

ENVIRONMENTAL CONSEQUENCES

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

This chapter analyzes both beneficial and adverse impacts that would result from implementing any of the alternatives considered in this plan/EA. This chapter also includes a summary of laws and policies relevant to each impact topic, definitions of impact thresholds (e.g., negligible, minor, moderate, and major), methods used to analyze impacts, and the analysis methods used for determining cumulative impacts. As required by the CEQ regulations implementing NEPA, a summary of the environmental consequences for each alternative is provided in table 3, which can be found in the "Alternatives" chapter. The resource topics presented in this chapter, and the organization of the topics, correspond to the resource discussions contained in the "Affected Environment" chapter.

SUMMARY OF LAWS AND POLICIES

Three overarching environmental protection laws and their implementing policies guide the actions of the NPS in the management of the parks and their resources—the *Organic Act of 1916* (16 USC 1), NEPA and its implementing regulations (42 USC 4321 et seq.; 40 CFR 1500–1508), and the *Omnibus Management Act*. For a complete discussion of these and other guiding authorities, refer to the section titled "Related Laws, Policies, Plans, and Constraints" in the "Purpose of and Need for Action" chapter. These guiding authorities are briefly described below.

The *Organic Act of 1916* (16 USC 1), as amended or supplemented, commits the NPS to making informed decisions that perpetuate the conservation and protection of park resources unimpaired for the benefit and enjoyment of future generations.

NEPA is implemented through regulations of the CEQ (40 CFR 1500–1508). The NPS has, in turn, adopted procedures to comply with these requirements, as found in Director's Order 12 (NPS 2001) and its accompanying handbook.

The *Omnibus Management Act* (16 USC 5901 et seq.) underscores the NEPA provisions in that both acts are fundamental to park management decisions. Both acts provide direction for connecting resource management decisions to the analysis of impacts and communicating the impacts of those decisions to the public, using appropriate technical and scientific information. Both acts also recognize that such data may not be readily available and they provide options for resource impact analysis should this be the case.

Section 4.5 of Director's Order 12 adds to this guidance by stating, "when it is not possible to modify alternatives to eliminate an activity with unknown or uncertain potential impacts, and such information is essential to making a well-reasoned decision, the NPS will follow the provisions of the CEQ regulations (40 CFR 1502.22)." In summary, the Park Service must state in an environmental assessment or impact statement (1) whether such information is incomplete or unavailable; (2) the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific adverse impacts that is relevant to evaluating the reasonably foreseeable significant adverse impacts; and (4) an evaluation of such impacts based on theoretical approaches or research methods generally accepted in the scientific community. Collectively, these guiding regulations provide a framework and process for evaluating the impacts of the alternatives considered in this plan/EA.

GENERAL METHODOLOGY FOR ESTABLISHING IMPACT THRESHOLDS AND MEASURING EFFECTS BY RESOURCE

The following elements were used in the general approach for establishing impact thresholds and measuring the effects of the alternatives on each resource category:

- general analysis methods as described in guiding regulations, including the context and duration of environmental effects
- basic assumptions used to formulate the specific methods used in this analysis
- thresholds used to define the level of impact resulting from each alternative
- methods used to evaluate the cumulative impacts of each alternative in combination with unrelated factors or actions affecting recreation area resources
- methods and thresholds used to determine if impairment of specific resources would occur under any alternative

GENERAL ANALYSIS METHODS

The analysis of impacts follows CEQ guidelines and Director's Order 12 procedures (NPS 2001) and is based on the underlying goal to protect and preserve natural and cultural resources and natural processes while providing access for appropriate recreational opportunities at Curecanti National Recreation Area. This analysis incorporates the best available scientific literature applicable to the region and setting, the species being evaluated, and the actions being considered in the alternatives. For each resource topic addressed in this chapter, the applicable analysis methods are discussed, including assumptions and impact intensity thresholds.

ASSUMPTIONS

Several guiding assumptions were made to provide context for this analysis. These assumptions are described below.

Analysis Period

Goals, objectives, and specific implementation actions needed to manage motorized vehicles at the recreation area are established for the next 15 to 20 years, or until conditions necessitate the plan being revised. For the purposes of the analysis, the life of the plan and period used for assessing impacts is up to 15 to 20 years.

Geographic Area Evaluated for Impacts (Area of Analysis)

The geographic study area (or area of analysis) for this plan includes Curecanti National Recreation Area in its entirety, as well as lands within the potential boundary expansion identified in the 2008 RPS/EIS (see the "Purpose of and Need for Action" chapter). The area of analysis for the cumulative impact assessments extends beyond the existing and proposed recreation area boundaries to include immediately adjacent lands for all impact topics.

Duration and Type of Impacts

Duration of impacts has been defined separately for each impact topic and is discussed at the beginning of each topic in this chapter. However, the following assumptions are used for all impact topics (the terms "impact" and "effect" are used interchangeably throughout this document):

- **Direct impacts** — Impacts would occur as a direct result of motorized vehicle access management actions
- **Indirect impacts** — Impacts would occur from motorized vehicle access management actions and would occur later in time or farther in distance from the action

Future Trends

The number of yearly visitors to Curecanti National Recreation Area has hovered at about 1 million visitors per year over the past 10 years. Facilities, access, and/or operations that are planned are not expected to substantially affect visitation. Changes are envisioned in the population of the counties in southwest Colorado, including those surrounding the recreation area (see "Curecanti National Recreation Area Plans, Policies, and Actions" section of the cumulative impact scenario discussion). Although it cannot be accurately predicted, visitation is expected to increase over the life of the plan, with slight variations from year to year.

Impacts of Climate Change

On a global scale, climate change has been linked to observed and projected changes in the water cycle. By the mid-21st century, average river runoff and water availability are projected to increase at high latitudes and decrease over dry regions at lower mid-latitudes such as the western United States. In Colorado, temperatures have increased by approximately 2°F between 1977 and 2006, and increasing temperatures are affecting the state's water resources. Climate models project Colorado will warm by 2.5°F by 2025 and 4°F by 2050, relative to the 1950–1999 baseline. Increases in temperature suggest more evaporation and evapotranspiration leading to higher water demands. Warming and changes in the form, timing and amount of precipitation will be very likely to lead to earlier melting and significant reductions in snowpack in the western mountains within the next 40 years. Recent hydrologic studies on climate change in the Upper Basin of the Colorado River point to an expected decline in runoff by the mid-to-late 21st century. These studies report multi-model average decreases ranging from 6% to 20% by 2050. The U.S. Climate Change Science Program (CCSP) projects that in the southwestern United States, the combination of increasing temperature and decreasing wintertime precipitation means that it is likely that droughts will become more severe. This synthesis is consistent with the conclusion of the Intergovernmental Panel on Climate Change (IPCC) that globally the negative impacts of climate change on water resources outweigh the positive (CWCB 2008).

Temperature-related changes in the state's water cycle, including drought severity, may have implications for cultural resources within the recreation area if water levels of Blue Mesa Reservoir are drastically reduced and undocumented resources are exposed. Changes in reservoir level could also affect visitor use patterns at the recreation area, exposing additional land below the high water line that could be available under some of the alternatives. Increases in temperature and/or changes in hydrology and precipitation could also affect the recreation areas natural resources, including the distribution of wildlife and wildlife habitat, species of special concern, and native vegetation.

Given the complex interactions among multiple factors and the uncertainties over human response to climate change in Colorado, the level of uncertainty about possible effects on specific resources or impact

topics over the 15 year planning period makes an analysis of impacts from climate change in this document speculative. In addition, given the 15 year planning period, it is not likely that climate change will have a substantial impact on temperature or reservoir levels during the life of this plan. Regardless, the plan's alternatives all include existing and/or proposed measures that could be used to protect park resources, including any previously unknown cultural resources, in light of such changes.

Impact Thresholds

Determining impact thresholds is a key component in applying NPS *Management Policies 2006* (NPS 2006b) and Director's Order 12 (NPS 2001). These thresholds provide the reader with an idea of the intensity of a given impact on a specific topic. The impact threshold is determined primarily by comparing the effect to a relevant standard based on applicable or relevant/appropriate regulations or guidance, scientific literature and research, or best professional judgment. Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this document. Intensity definitions are provided throughout the analysis for negligible, minor, moderate, and major impacts. In all cases, impact thresholds are defined for adverse impacts. Beneficial impacts are addressed qualitatively for all topics except the cultural resource topics, which require a more quantitative analysis of beneficial impacts for Section 106 compliance purposes.

CUMULATIVE IMPACTS ANALYSIS METHOD

The CEQ regulations for NEPA implementation require the assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). As stated in the CEQ handbook, "Considering Cumulative Effects Under the National Environmental Policy Act" (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful. Cumulative impacts are considered for all alternatives, including alternative A.

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects and plans at the recreation area and, if applicable, the surrounding area. Table 10 summarizes these actions that could affect the various resources at the recreation area, along with the plans and policies of both the recreation area and surrounding jurisdictions, which were discussed in the "Purpose of and Need for Action" chapter. Additional explanation for most of these actions is provided in the narrative following the table.

The analysis of cumulative impacts was accomplished using four steps:

> **Step 1: Identify resources affected**. Fully identify resources affected by any of the alternatives. These include the resources addressed as impact topics in the "Affected Environment" and "Environmental Consequences" chapters of this plan/EA.
>
> **Step 2: Set boundaries**. Identify an appropriate spatial and temporal boundary for each resource. For this plan/EA, the spatial boundary for cumulative impacts for all resources was considered the park unit and adjacent lands. This area was chosen because of potential impacts from the use and management of motorized vehicles within and adjacent to Curecanti. The temporal boundary for all the impact topics begins in 1965, which coincides with the construction of the reservoir, the management of the area by the NPS, and the beginning of public recreation at Curecanti. This

boundary extends for a period of 15 to 20 years after the completion of this plan, as the plan is expected to guide the management of motorized vehicle access for at least this term.

Step 3: Identify cumulative action scenario. Determine which past, present, and reasonably foreseeable future actions to include with each resource. These are listed in table 10 and described below.

Step 4: Perform cumulative impact analysis. Summarize impacts of these other actions (x) plus impacts of the proposed action (y), to arrive at the total cumulative impact (z). This analysis is included for each resource in the "Environmental Consequences" chapter.

CUMULATIVE IMPACT SCENARIO

The following describes in more detail the various cumulative scenario plans, policies, and actions listed in table 10, starting with those specific to the recreation area, followed by actions and plans of other agencies or private entities.

TABLE 10: CUMULATIVE IMPACT SCENARIO

Impact Topic	Past Actions	Current Actions	Future Actions (15–20 years)
Cultural Resources	2004 Disturbed Lands Inventory and Restoration Recommendations BLM Gunnison and Uncompahgre Basin Resource Management Plans Prior travel management plans of adjacent land management agencies 2007 Interim OHV Management Plan 1980 General Management Plan Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park (Note: ORV use on old railroad bed) Dickerson Pit Vandalism and poaching Cultural resource protection measures	2004 Disturbed Lands Inventory and Restoration Recommendations BLM Gunnison and Uncompahgre Basin Resource Management Plans 2007 Interim OHV Management Plan 1997 General Management Plan Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park (Note: ORV use on old railroad bed) Vandalism and poaching Cultural resource protection measures	2004 Disturbed Lands Inventory and Restoration Recommendations DOE Designation of Energy Corridors Continued implementation of 1997 General Management Plan provisions that do not change as part of this plan/EA New BLM-USFS travel management plan Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park (Note: ORV use on old railroad bed) Vandalism and poaching Cultural resource protection measures

Impact Topic	Past Actions	Current Actions	Future Actions (15–20 years)
Visitor Use and Experience	Prior travel management plans of adjacent land management agencies BLM Gunnison Resource Area and Uncompahgre Basin Resource Management Plans Dickerson Pit (closures to public) 2007 Interim OHV Management Plan (includes accessibility issues that arose) ORV use adjacent to the park Snowmobile/PWC/boating management and regulations Park concessions/commercial services Western/Reclamation facilities development/management (includes impacts on public access) 1980 General Management Plan Invasive Mussel Prevention Program 1997 General Management Plan Hunting in and around the park	Travel management plans of adjacent land management agencies BLM Gunnison Resource Area and Uncompahgre Basin Resource Management Plans Dickerson Pit (closures to public) 2007 Interim OHV Management Plan Western/Reclamation facilities development/management Snowmobile/PWC/boating management and regulations Park concessions/commercial services ORV use adjacent to the park Invasive Mussel Prevention Program 1997 General Management Plan Resource/management closures Hunting in and around the park (access, and modification of hunting regulations) NPS Park Asset Management Plan	New BLM-USFS travel management plan 2008 Resource Protection Study Possible wilderness designation Increasing public demand for additional and more diverse recreational opportunities Dickerson Pit (closures to public) Western/Reclamation facilities development/management Snowmobile/PWC/boating management and regulations Park concessions/commercial services ORV use adjacent to the park Continued implementation of 1997 General Management Plan provisions that do not change as part of this plan/EA Invasive Mussel Prevention Program Resource/management closures Hunting in and around the park (access, and modification of hunting regulations) NPS Park Asset Management Plan

Impact Topic	Past Actions	Current Actions	Future Actions (15–20 years)
Vegetation	2004 Disturbed Lands Inventory and Restoration Recommendations BLM Gunnison Resource Area and Uncompahgre Basin Resource Management Plans 2007 Interim OHV Management Plan 1980 General Management Plan 1997 General Management Plan Prior travel management plans of adjacent land management agencies Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park Dickerson Pit Past fire management (suppression) Noxious Weed Operating Plan Sage-grouse and Prairie Dog management plans, including associated habitat management/manipulation	2004 Disturbed Lands Inventory and Restoration Recommendations BLM Gunnison Resource Area and Uncompahgre Basin Resource Management Plans 2007 Interim OHV Management Plan 1997 General Management Plan Ongoing Curecanti National Recreation Area facility improvements Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park Dickerson Pit Curecanti National Recreation Area Fire Management Plan (NPS 2006g) Noxious Weed Operating Plan Sage-grouse and Prairie Dog management plans, including associated habitat management/manipulation	Continued implementation of 1997 General Management Plan provisions that do not change as part of this plan/EA DOE Designation of Energy Corridors New BLM-USFS travel management plan Ongoing Curecanti National Recreation Area facility improvements Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park Dickerson Pit Curecanti National Recreation Area Fire Management Plan (NPS 2006g) Noxious Weed Operating Plan Sage-grouse and Prairie Dog management plans, including associated habitat management/manipulation
Wildlife and Wildlife Habitat	*Same as Vegetation, plus*: CDOW management and regulations (including hunting and wildlife feeding program, wildlife re-introduction, including bighorn sheep) Poaching	*Same as Vegetation, plus*: CDOW management and regulations (including hunting and wildlife feeding program) Poaching	*Same as Vegetation, plus*: CDOW management and regulations (including hunting and wildlife feeding program); bighorn sheep introductions Poaching
Species of Special Concern	*Same as Wildlife and Wildlife Habitat, plus*: BLM Gunnison Resource Area Management Plan (area of critical environmental concern [ACEC] designation for skiff milkvetch) Inventory and monitoring of sensitive plants	*Same as Wildlife and Wildlife Habitat, plus*: Inventory and monitoring of sensitive plants	*Same as Wildlife and Wildlife Habitat, plus*: Inventory and monitoring of sensitive plants

Impact Topic	Past Actions	Current Actions	Future Actions (15–20 years)
Soils	*Same as Vegetation, plus*: Past fire management (suppression) Noxious Weed Operating Plan Sage-grouse and prairie dog management plans, including associated habitat management/manipulation	*Same as Vegetation, plus*: Curecanti National Recreation Area Fire Management Plan (NPS 2006g) Noxious Weed Operating Plan Sage-grouse and prairie dog management plans, including associated habitat management/manipulation	*Same as Vegetation, plus*: Curecanti National Recreation Area Fire Management Plan (NPS 2006g) Noxious Weed Operating Plan Sage-grouse and prairie dog management plans, including associated habitat management/manipulation
Paleontological Resources	2004 Disturbed Lands Inventory and Restoration Recommendations BLM Gunnison and Uncompahgre Basin Resource Management Plans Prior travel management plans of adjacent land management agencies 2007 Interim OHV Management Plan 1980 General Management Plan Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park (Note: ORV use on old railroad bed) Dickerson Pit Vandalism and poaching Cultural resource protection measures	2004 Disturbed Lands Inventory and Restoration Recommendations BLM Gunnison and Uncompahgre Basin Resource Management Plans 2007 Interim OHV Management Plan 1997 General Management Plan Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park (Note: ORV use on old railroad bed) Vandalism and poaching Cultural resource protection measures	2004 Disturbed Lands Inventory and Restoration Recommendations DOE Designation of Energy Corridors Continued implementation of 1997 General Management Plan provisions that do not change as part of this plan/EA New BLM-USFS travel management plan Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park (Note: ORV use on old railroad bed) Vandalism and poaching Cultural resource protection measures

Impact Topic	Past Actions	Current Actions	Future Actions (15–20 years)
National Recreation Area Management and Operations (including land management surrounding National Recreation Area /Agency coordination)	Travel management plans of adjacent land management agencies BLM Gunnison Resource Area and Uncompahgre Basin Resource Management Plans Past fire management (suppression) 2007 Interim OHV Management Plan Snowmobile/PWC/boating management and regulations Park concessions/commercial services 1980 General Management Plan 1997 General Management Plan Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park Dickerson Pit CDOW management and regulations (hunting, re-introduce wildlife including bighorn sheep, wildlife feeding program) Sage-grouse and prairie dog management plans, including associated habitat management/manipulation	Travel management plans of adjacent land management agencies BLM Gunnison Resource Area and Uncompahgre Basin Resource Management Plans 2006 Fire Management Plan 2007 Interim OHV Management Plan Snowmobile/PWC/boating management and regulations Park concessions/commercial services 1997 General Management Plan Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park Dickerson Pit CDOW management and regulations (hunting, wildlife feeding program) Sage-grouse and prairie dog management plans, including associated habitat management/manipulation NPS Park Asset Management Plan	New BLM-USFS travel management plan DOE Designation of Energy Corridors 2006 Fire Management Plan 2008 Resource Protection Study Snowmobile/PWC/boating management and regulations Park concessions/commercial services Continued implementation of 1997 General Management Plan provisions that do not change as part of this plan/EA Western/Reclamation facilities development/management State and County road construction/maintenance Private land development Grazing in and adjacent to park ORV use adjacent to the park Dickerson Pit CDOW management and regulations (hunting, wildlife feeding program); bighorn sheep introductions Sage-grouse and prairie dog (2009 draft) management plans NPS Park Asset Management Plan

CURECANTI NATIONAL RECREATION AREA PLANS, POLICIES, AND ACTIONS

Recreation Area Plans and Policies

The General Management Plan: Black Canyon of the Gunnison National Monument and Curecanti National Recreation Area (NPS 1980, 1997a), Off-Highway Vehicle Evaluation and Interim Management Plan: Curecanti National Recreation Area (OHV Interim Management Plan) (NPS 2007a), Black Canyon of the Gunnison National Park and Curecanti National Recreation Area Disturbed Lands Inventory and Restoration Recommendations (NPS 2004b), Final Resource Protection Study/Environmental Impact Study (RPS/EIS) (NPS 2008a), Noxious Weed Annual Operating Plan, and NPS Park Asset Management Plan are all park planning documents that include policies, goals, or desired conditions, that, when implemented, could contribute to the cumulative effects on the resources addressed by this plan. These plans are described in the "Purpose of and Need for Action" chapter under "Related Curecanti National Recreation Area Planning Documents." Other related actions are described below.

Facility Improvements/Facility Expansion

The recreation area contains hiking trails, campgrounds, picnic areas, horse trails, boat launch areas, visitor centers, and other facilities that must be maintained and may be improved. Past, present, and future maintenance of these facilities might involve construction activities which could result in impacts to natural resources such as soils and vegetation. Associated temporary closures could affect visitor use and experience. Any expansion of existing Western/Reclamation facilities could also affect natural and cultural resources.

Sensitive Plant Inventory and Monitoring

The recreation area conducts an annual inventory of known locations of Gunnison milkvetch (*Astragalus anisus*) and adobe thistle (*Cirsium perplexens*). Monitoring the condition of these species could result in the establishment of additional protective measures in future planning efforts.

Fire Management

Prior to implementing the 2006 Fire Management Plan, Curecanti staff followed a policy of full fire suppression. Currently, fire management is guided by the 2006 plan, which provides greater flexibility for managing wildfire. The plan includes the use of prescribed burns as a tool to manage natural and cultural resources. According the plan, prescribed burns can increase native plant diversity, reduce exotic plant species, and improve wildlife habitat by reducing woody vegetation and increasing herbs and forbs. Prescribed burns also remove natural fuel accumulations, which would reduce the potential for damage to cultural resources by reducing the existing fuel load, thereby decreasing the potential for a catastrophic fire event. Prescribed burns could also impact recreational resources if trails or use areas are closed to visitors during planned burn activities. The plan indicates that wildfire and prescribed fire events will be coordinated with other agencies (BLM, USFS, Reclamation, Western, and CDOW) and affected adjacent private landowners.

Personal Watercraft, Snowmobile, and Boating Management/Regulations

In November 2002, PWC use was prohibited at the recreation area as a result of litigation. The recreation area subsequently completed an EA, and a final rule authorizing PWC use as an appropriate recreational opportunity was published in the Federal Register in September 2006. Regulations governing the operation of PWCs, snowmobiles, and boats are found in 36 CFR 7.51 and in the Superintendent's

Compendium (NPS 2009f). These regulations, including a rule for snowmobile use, address such topics as speed limits, areas of operation, equipment requirements, permits, inspections, and fees.

CULTURAL RESOURCE PROTECTION MEASURES

Condition Assessments of Known Archeological Sites

In general, cultural resource surveys conducted before 1985 are seen as having a high potential for inadequate information. In 2000, recreation area staff members began an effort to revisit all sites in the park unit to update information and conduct a condition assessment for each site. The condition of the site is documented and recorded as good, fair, poor, inundated/uncertain, not relocated/unknown, or destroyed. These assessments allow park staff to document the condition of the resource and whether protection measures are adequate.

Surveys and Mitigation of Cultural Sites

Surveys of cultural sites began in the 1940s at the area now managed as the recreation area. Numerous surveys have been conducted since then and have most often been associated with proposed construction projects, prescribed burning, or determination of eligibility to the National Register of Historic Places. The total site count for the recreation area, as of July 2009, is 434 known cultural sites. Some of the previous surveys have involved the mitigation of disturbed sites. All routes and areas associated with this motorized vehicle access management plan that had not been previously surveyed were surveyed in 2009.

Listing of Resources and Establishment of Cultural District

The considerable amount of prehistoric and historic archeological sites that were discovered within the recreation area prompted the NPS to conserve 5,000 acres as the Curecanti Archeological District in 1982, which is currently listed on the National Register of Historic Places. Five structures are currently listed on the NPS List of Classified Structures for the recreation area. These actions provide protection for cultural resources at Curecanti, and listed resources are discussed further in the "Affected Environment" chapter.

Resource/Management Closures

The Superintendent's Compendium (NPS 2009f) establishes areas where vehicles and/or pedestrians are prohibited. These areas include cultural and historic resource sites, sensitive wildlife habitat, and areas closed seasonally or year-round for public safety reasons. Although these temporary, seasonal, and year-round closures provide benefits to resources and public safety, they could result in adverse impacts to visitor use and experience if popular destinations, trails, or routes are closed for substantial periods of time or during times of peak visitation. More information about the closures listed in the Superintendent's Compendium (NPS 2009f) can be found in the "Visitor Use and Experience" section of the "Affected Environment" chapter.

INVASIVE MUSSEL PREVENTION PROGRAM

Invasive mussel species can clog reservoir infrastructure, damage boats and docks, and disrupt the native aquatic ecosystem. Therefore, the NPS requires all motorized watercraft launching in the recreation area to be inspected for invasive mussels and, if necessary, decontaminated in accordance with procedures set by the Colorado Division of Wildlife. Additionally, in compliance with the State of Colorado's Aquatic Nuisance Species Regulations (2 CCR 405-1 Chapter 8), all motorized watercraft leaving Blue Mesa, Morrow Point, or Crystal reservoirs undergo a second inspection to verify the watercraft have been

cleaned, drained and dried. These requirements have the potential to affect visitor use and enjoyment of the recreation area.

CONCESSIONS AND COMMERCIAL SERVICES

Although there is no official concessions or commercial services plan for Curecanti, there are two marinas operated by concession on Blue Mesa Reservoir: one at Elk Creek and one at Lake Fork. Services at the marinas include showers, groceries, fishing supplies, slip rentals, boat rentals, fuel sales, boat repairs, and dry boat storage. The concession offers guided fishing on Morrow Point Reservoir. The concessioner operates a restaurant providing food service near Elk Creek Marina. Another concessioner operates and maintains the Soap Creek campground under a USFS contract.

OTHER AGENCY OR PRIVATE PLANS, POLICIES, OR ACTIONS

"Prior Travel Management Plans of Adjacent Land Management Agencies" is discussed in the "Purpose of and Need for Action" chapter and involves the management of motorized vehicles on adjacent BLM and USFS lands.

BLM GUNNISON RESOURCE AREA AND UNCOMPAHGRE BASIN RESOURCE MANAGEMENT PLANS

The 1993 Gunnison Resource Area Resource Management Plan (RMP) manages approximately 585,000 surface acres and 727,000 acres of mineral estate within the Gunnison planning area. The 1989 Uncompahgre Basin RMP covers approximately 483,000 surface acres of public land and 756,000 acres of federal mineral estate in the Uncompahgre Basin planning area. These plans provide the BLM with standards for managing and/or protecting resources such as air quality, minerals, oil/gas/geothermal resources, soils, water, vegetation, wildlife, and livestock grazing. In the Gunnison Resource Area RMP, the BLM has designated three areas of critical environmental concern (ACEC) adjacent to the recreation area: West Antelope ACEC, South Beaver Creek ACEC, and Dillon Pinnacle ACEC. The West Antelope ACEC is approximately 28,000 acres in size and contains crucial big game winter range, the highest concentration of wintering elk and deer in the Gunnison planning area, bald eagle habitat, the Dillon Mesa bighorn sheep herd, and the Sapinero State Wildlife Area. This ACEC (also known as Management Unit 7) is managed to improve the capabilities of the resources in the unit to support wintering elk, deer, and bighorn sheep. Management considerations include limitations and restrictions on land disturbing activities, oil/gas/mining operations, logging, and motorized vehicle use. The South Beaver Creek ACEC is approximately 4,570 acres and contains crucial big game winter range and scattered populations of skiff milkvetch. This ACEC is managed to protect and enhance existing populations and habitat of skiff milkvetch. Management techniques in the South Beaver Creek ACEC include plant-monitoring studies and habitat improvements in addition to restrictions on land-disturbing activities, chemical spraying, livestock grazing, oil/gas/geothermal operations, and off-highway vehicle (OHV) use. The Dillon Pinnacles ACEC (Management Unit 9) covers 535 acres and contains big game winter range and scenic cliffs and spires. This ACEC is managed to protect scenic and recreational opportunities. Management prescriptions for Dillon Pinnacles include the potential acquisition of 270 acres of adjacent non-federal lands in addition to restrictions or prohibitions on land-disturbing activities, livestock grazing, oil/gas/geothermal operations, and OHV use. There are no mineral leases on BLM managed lands adjacent to the recreation area (Lazorchak 2009).

THE 1983 GRAND MESA, UNCOMPAHGRE, AND GUNNISON NATIONAL FOREST LAND MANAGEMENT PLAN

This plan, as amended in 1991 and 1993, provides direction and guidelines for resource management and land use on National Forest System lands within the Grand Mesa, Uncompahgre, and Gunnison National Forests. The goals of the plan include managing vegetation to maintain a healthy forest, increasing recreational opportunities (including primitive opportunities on wilderness land), recommending an increase in designated wilderness area, improving wildlife habitat, increasing permitted livestock grazing, protecting water quality, encouraging environmentally sound energy and minerals development, emphasizing energy exploration and development, and reducing trail/road mileage. The 1993 amendment designated 813,180 acres as available for oil and gas leasing and 138,270 acres not available for leasing, thus reducing the total acreage available for leasing. The amendment also established stipulations required to protect resources from effects of drilling and producing activities. Protected resources include wetlands or riparian areas, certain types of wildlife habitat, and steep or unstable slopes. As of October 2006, there were 146,000 acres leased and an additional 260,000 acres nominated for lease (USFS 2007).

GUNNISON SAGE-GROUSE CONSERVATION PLANS

The Gunnison sage-grouse is a state species of concern and has important habitat located within and around the recreation area. There are two conservation plans in place that address the Gunnison sage-grouse, one of which is a local basinwide plan and the other of which covers the entire range of the Gunnison sage-grouse.

Gunnison Sage-Grouse Conservation Plan (1997)

Conservation actions in this plan include:

- Providing education to the public about the importance of sage-grouse habitat
- Research and monitoring
- Mapping and inventory of sage-grouse habitat and related information
- Addressing the permanent loss of habitat through public education and incentive programs
- Improving the quality of existing habitat through vegetation treatments, livestock management, big game management, and structural improvements
- Reducing physical disturbance through predator management, recreation management, and evaluating ground-disturbing activities

Rangewide Conservation Plan (2005)

This Colorado Division of Wildlife plan (in conjunction with the Sage Grouse Working Group) provides the latest in scientific knowledge with respect to minimum viable population size and habitat requirements for the Gunnison sage-grouse. The purpose of the plan is to protect, enhance, and conserve Gunnison sage-grouse populations and their habitats. It provides a rangewide perspective, guidance and recommendations to local working groups and other interested or affected parties and stakeholders.

GUNNISON BASIN FEDERAL LANDS TRAVEL MANAGEMENT / DRAFT ENVIRONMENTAL IMPACT STATEMENT

The DEIS was released on March 6, 2009 (USFS/BLM 2009), and provides analysis of the effects of modifying the current travel plan pertaining to motorized and mechanized vehicles for those federal lands managed by the USFS and BLM in the upper Gunnison Basin and North Fork Valley. The lands addressed in this analysis are the federal lands administered by the USFS on the Gunnison and Paonia Ranger Districts of the Gunnison, Uncompahgre, and Gunnison National Forest and BLM for the Gunnison Field Office area. The proposed action maintains about 2,450 miles of roads, 530 miles of motorized trails, and 450 miles of non-motorized trails open for public travel. The vehicle types to be allowed for motorized travel (e.g., full-sized highway vehicles, OHVs greater than 50 inches in width, ATVs, OHVs 50 inches or less in width, and motorcycles) on these roads and trails varies depending upon the design, width, and optimal recreation opportunity attributed to these roads and trails. The Proposed Action also identifies managed trails open for non-motorized travel. There would be about 192 miles of designated non-motorized trails where mechanized travel (e.g., mountain bikes) would be allowed. Another 260 miles of non-motorized trails are intended for hikers and horseback riders, and on these trails, mechanized travel would be restricted. There are designations for roads to be managed for administrative purposes (e.g., timber sales, energy exploration, mining, and private land access) that would not be open to public travel. There are about 320 miles of these non-public roads on federal lands within the analysis area.

COLORADO GUNNISON'S AND WHITE-TAILED PRAIRIE DOG CONSERVATION STRATEGY (JULY 2009 DRAFT)

The recreation area is in the process of developing a Gunnison's Prairie Dog Plan for Curecanti. In the interim, recreation area staff is basing its management actions on the CDOW Draft Gunnison's and White-Tailed Prairie Dog Conservation Strategy. The Curecanti plan will dovetail with the statewide plan and the related Draft Gunnison Basin Gunnison's Prairie Dog Action Plan. The purpose of the state conservation strategy is to

- promote conservation of both species and their habitats;
- identify specific research needs;
- examine existing regulatory mechanisms and their ability to maintain viable populations;
- reduce the risk of factors negatively impacting populations; and
- increase stakeholder participation in prairie dog conservation efforts.

This strategy calls for the development of local action plans that will be tailored to address issues ranked as having high negative impacts on Gunnison's and white-tailed prairie dog populations. Prioritized strategies will be implemented using cooperative efforts to alleviate negative impacts to help ensure long-term viability statewide.

Proposed management strategies include the following:

- Mitigate plague outbreaks by dusting, translocation, closures, land protection, predator control, and increased monitoring.
- Improve range condition through habitat manipulation initiatives such as chaining, initiating fire regimes, reseeding native grasses, and cheat grass eradication.

- Develop conservation easements or non-lethal control options (translocation, public education, and green barriers).
- Reviewing hunting regulations, implementing closures, monitoring take, and educating the public.
- Tracking impacts to colonies from oil and gas development.

COLORADO DIVISION OF WILDLIFE MANAGEMENT AND REGULATIONS

Hunting is permitted within and adjacent to the recreation area in accordance with federal and Colorado state regulations. The CDOW promulgates and enforces regulations for hunting big game, small game, and waterfowl. These regulations include restrictions on the number of animals that can be harvested, the type of weapons and methods that can be used to hunt, the time of year when species may be hunted, areas where hunting is allowed or prohibited, and the types of species that may not be hunted or harassed.

Beginning in the 1970s, and as recently as 1995, the CDOW reestablished or augmented a bighorn population in the area through transplanting animals. Sheep have been transplanted into various areas including Dillon Mesa, Lake Fork, West Elk, Dillon Gulch, and the Gunnison Gorge. As of 2007, it was estimated that the West Elk-Dillon Mesa herd contained 100 animals and the Black Canyon herd contained 30 animals. The draft Colorado Bighorn Sheep Management Plan 2009−2019 indicates that the CDOW will continue to translocate bighorn sheep in order to reintroduce them into historic or suitable habitat or to augment existing populations, although no specific augmentation actions are planned for the West Elk-Dillon Mesa herd.

The CDOW has an emergency wildlife feeding program that has been implemented when winter weather conditions and snowpack inhibit big game animals from accessing their normal food sources. The program involves providing feed or hay for elk, deer, pronghorn, and bighorn sheep. Previous winter feeding operations were conducted in the Gunnison area in 1984, 1997, and 2008.

DESIGNATING ENERGY CORRIDORS ON USFS/BLM LANDS EIS

This project calls for designating energy transmission corridors that will foster future projects to deliver electricity, oil, natural gas, and hydrogen to markets and users in the 11 western states and addressing the need for upgraded and new electricity transmission and distribution facilities to improve reliability, relieve congestion, and enhance the capability of the national grid to deliver electricity. These corridors are agency-preferred locations where pipelines and transmission lines may be sited and built in the future. For the most part, the corridors follow existing infrastructure such as highways, transmission lines, or pipelines to avoid placing corridors in new locations. In the Gunnison area, the energy corridors are located on BLM lands and not USFS lands. As of July 2009, the BLM did not have any applications for rights-of-way associated with the designated energy corridor. The corridor designated in the Gunnison area follows one of the Western transmission lines across Gunnison Basin, and crosses national recreation area lands along the Lake Fork Arm. Future energy transmission in the Gunnison Basin would likely be within the existing Western corridors.

WESTERN AREA POWER ADMINISTRATION / BUREAU OF RECLAMATION FACILITIES CONSTRUCTION/MANAGEMENT

Construction of the dams and reservoirs in the recreation area began in 1962 with the start of Blue Mesa Dam, which was completed in 1966. Morrow Point Dam was completed in 1968 and Crystal Dam was completed in 1976. Reclamation has the responsibility of operating and maintaining the dams, reservoirs, associated power plants, and related facilities in and around the recreation area. Reclamation has the

authority to repair, replace, or add to any of its facilities as necessary. Since 1977, Western has operated and maintained the power transmission system. Future demand and/or changing technologies may require the establishment of new corridors / rights-of-way within and adjacent to the recreation area. Development of these facilities would have impacted natural and cultural resources through flooding and other ground disturbances.

STATE AND COUNTY ROADS

There are numerous county and CDOT roads and rights-of-way in and around the recreation area, including the major highways of US 50 and Colorado State Highway 92 (CO 92) and CO 149, which provide public access to Curecanti. CDOT, in coordination with the Federal Highway Administration, is responsible for maintenance, construction activities, and traveler enhancements that occur on routes US 50, CO 92, and CO 149. Montrose and Gunnison counties are also responsible for maintaining and enhancing the network of county roads that surround the recreation area. Maintenance activities and improvements to road networks have the potential to impact natural and cultural resources and may also affect visitor use and experience as well as visitor safety.

PRIVATE LAND DEVELOPMENT

A substantial amount of private land exists adjacent to the recreation area, especially on the south side and west of the Lake Fork Arm of the Blue Mesa Reservoir. The majority of these private lands are in agricultural use, with some areas of rural residential development and vacant land nearby. New and existing private land development around the recreation area also involves the construction and maintenance of services and facilities including power lines, phone lines, water lines, and roads. There are some private lands under conservation easement adjacent to the recreation area, but for the most part the private lands in the area can be developed in accordance to the land use regulations of Gunnison and Montrose Counties. Private lands in Montrose County adjacent to the recreation area are zoned general agricultural, which allows for agricultural, oil and gas exploration, mineral exploration, and low-density residential uses. Although Gunnison County does not have traditional zoning, new development would require a land use change permit, which considers impacts to resources including wildlife habitat, water quality, scenic resources, agricultural lands, steep slopes, and floodplains. However, it is expected that the population of Gunnison and Montrose counties will grow from around 55,000 to approximately 78,000 by the year 2020. Therefore, it would stand to reason that an increase in residential development would also occur during this time (CSDO 2009).

GRAZING IN AND ADJACENT TO THE RECREATION AREA

Livestock grazing has occurred since before the establishment of the recreation area and continues to occur in numerous locations adjacent to and inside the recreation area. Grazing of sheep, cattle, and horses occurs on NPS, BLM, USFS, and private property in the region. Depending on the intensity of the operation, livestock grazing has the potential to result in soil erosion, soil compaction, the spread of invasive species, and excessive vegetation removal.

Acreage of grazing allotments adjacent to Curecanti:

- BLM Gunnison: 74,025 acres (includes private and state lands managed by BLM)
- BLM Montrose/Uncompahgre: 8,011 acres
- USFS Gunnison: 40,000 acres
- USFS Paonia: not available

OFF-ROAD VEHICLE USE ADJACENT TO THE RECREATION AREA

There has been recreational ORV use in the recreation area since its establishment in 1965. ORV use also occurs on adjacent public and private lands with the majority of off-road use occurring on nearby USFS/BLM lands which contain hundreds of miles of vehicle routes open for public use. While most of the vehicular use inside the recreation area is by typical street-legal cars and trucks, much of the vehicular use on adjacent lands involves the use of ORVs such as ATVs, jeeps, or other high-clearance vehicles. The use of vehicles off formal roads has the potential to cause impacts to soils, wildlife, wildlife habitat, cultural and archeological resources, and visitor experience.

DICKERSON PIT

The Dickerson Pit is a granite mining operation that is located within the recreation area, approximately 1.5 miles southwest of the east entrance point. Although the subsurface (mineral) rights are privately owned, the NPS owns the surface of the quarry. Surveys at the quarry have documented cultural materials covering a wide range of time and at least one feature that could be the remains of a prehistoric dwelling. The owners of the Dickerson Pit donated a portion of the mineral rights to the NPS which provided for the continued preservation of the cultural deposits in an intact condition. The NPS has managed the mineral operations at the Dickerson Pit under a special use permit since the 1980s. From the date of the original special use permit until 2003, operations at the quarry resulted in the disturbance of approximately 12.4 acres. In 2003, the NPS completed an EA that allowed the quarry to expand mining operations that could result in a total mined area of approximately 31.9 acres, which comprised the total remaining acreage of the mineral estate. The EA indicated that the mining of the additional 19.5 acres could occur over a period of up to 42 years, but would depend on market demand. Operation of the quarry involves drilling, blasting, extracting, crushing, and hauling of mined material. Occasionally, Route 50 must be closed for safety reasons when blasting occurs. An archeological resources mitigation plan was included with the EA that would mitigate the expected adverse effect to cultural resources (NPS 2003b).

VANDALISM AND POACHING

Recreation area staff members have documented incidents of visitors causing damage to and/or removing cultural resources. Poaching of wildlife in the recreation area has also occurred. Although park rangers patrol the recreation area, vandalism and poaching has and will continue to have potential impacts to cultural and natural resources.

INCREASING PUBLIC DEMAND FOR ADDITIONAL AND MORE DIVERSE RECREATIONAL OPPORTUNITIES

Since 1991, when Colorado State Parks first began managing the Off-highway Vehicle Registration Program, registrations have increased from nearly 12,000 to almost 131,000 in 2007. The Colorado State Demography Office estimates the state population will grow to 7.3 million by 2030. Between 2007 and 2030, the Southwest Region (i.e., Archuleta, Delta, Dolores, Gunnison, Hinsdale, La Plata, Montezuma, Montrose, Ouray, San Juan, and San Miguel counties) is projected to grow by 134,000 people, a 71 percent increase that will result in an increased demand for outdoor recreation and public land use in southwest Colorado. Anticipating this increase in demand, the NPS analyzed appropriate recreational opportunities at Curecanti National Recreation Area during development of their RPS/EIS, identifying 37 recreational opportunities that would be appropriate and 17 that may be appropriate.

WILDERNESS DESIGNATION

Congress designated the West Elk Wilderness in 1964 and it now has a total of 176,412 acres, all of which are on USFS lands. Motorized vehicles are not allowed in wilderness pursuant to the enabling legislation designating the areas. Legislation to expand the West Elk Wilderness Area has been proposed since 1999. The proposed wilderness addition would include the area of land between Coal Creek and Red Creek and would create a continuous wilderness from US Highway 50 north almost to the Kebler Pass Road. This would include some lands proposed for inclusion in the recreation area as part of the RPS/EIS, as well as lands adjacent to the park unit. If this addition to the wilderness area were to be designated, it could affect the recreational opportunities in the area due to increased restrictions on certain types of visitor uses.

IMPAIRMENT ANALYSIS METHOD

The "Purpose of and Need for Action" chapter describes the related federal acts and policies regarding the prohibition against impairing recreation area resources and values in units of the national park system. According to NPS *Management Policies 2006*, an action constitutes an impairment when an impact "would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2006b, sec. 1.4.5). To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts" (NPS 2006b, sec. 1.4.5).

National park system units vary based on their enabling legislation, natural and cultural resources present, and park missions; likewise, the activities appropriate for each unit and for areas in each unit also vary. For example, an action appropriate in one unit could impair resources in another unit. Thus, this document analyzes the context, duration, and intensity of impacts of the alternatives, as well as the potential for resource impairment, as required by Director's Order 12 (NPS 2001). As stated in the NPS *Management Policies 2006* (NPS 2006b, sec. 1.4.5), an impact on any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

The following process was used to determine whether the various motorized vehicle access management alternatives had the potential to impair park resources and values:

Step 1 — The enabling legislation and the recreation area's general management plan (NPS 1997a) were reviewed to ascertain its purpose and significance, resource values, and resource management goals or desired conditions.

Step 2 — Resource management goals were identified.

Step 3 — Thresholds were established for each resource of concern to determine the context, intensity, and duration of impacts, as defined earlier in this chapter under "Impact Thresholds."

Step 4 — An analysis was conducted to determine if the magnitude of impact would constitute an "impairment," as defined by NPS *Management Policies 2006* (NPS 2006b).

The impact analysis includes findings of impairment of recreation management resources for each of the management alternatives. Visitor use, park operations and management, and socioeconomic environment are not considered resources per se, although they are dependent on the conservation of park resources. Impairment findings are not included as part of the impact analysis for these topics.

CULTURAL RESOURCES

GUIDING REGULATIONS AND POLICIES

Federal actions that have the potential to affect cultural resources are subject to a variety of laws. The *National Historic Preservation Act* (1966, as amended) is the principal legislative authority for managing cultural resources associated with NPS projects. Generally, Section 106 of the act requires all federal agencies to consider the effects of their actions on cultural resources listed on or determined eligible for listing on the National Register of Historic Places. Such resources are termed historic properties. Agreement on how to mitigate effects to historic properties is reached through consultation with the State Historic Preservation Officer; the Tribal Historic Preservation Officer, if applicable; and the Advisory Council on Historic Preservation, as necessary. In addition, federal agencies must minimize harm to historic properties that would be adversely affected by a federal undertaking. Section 110 of the act requires federal agencies to establish preservation programs for the identification, evaluation, and nomination of historic properties to the National Register.

The *National Historic Preservation Act* established the National Register of Historic Places, the official list of the nation's historic places worthy of preservation. Administered by the NPS, the National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources. The criteria applied to evaluate properties are contained in 36 CFR 60.4. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

(a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) that are associated with the lives of persons significant in our past; or

(c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) that have yielded or may be likely to yield, information important in prehistory or history.

Cultural resources that meet the eligibility criteria for listing on the National Register of Historic Places are considered "significant" resources and must be taken into consideration during the planning of federal projects.

Other important laws or Executive Orders designed to protect cultural resources include, but are not limited to:

- *NPS Organic Act*—to conserve the natural and historic objects within parks unimpaired for the enjoyment of future generations;
- *American Indian Religious Freedom Act*—to protect and preserve for American Indians access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites;
- *Archeological Resources Protection Act*—to secure, for the present and future benefit of the American people, the protection of archeological resources and sites that are on public lands and Indian Lands;
- *National Environmental Policy Act* (NEPA)—to preserve important historic, cultural, and natural aspects of our national heritage
- Executive Order 11593 (Protection and Enhancement of the Cultural Environment)—to provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation; and
- Executive Order 13007 (Indian Sacred Sites)—to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites.

Through legislation and the Executive Orders listed above, the NPS is charged with the protection and management of cultural resources in its custody. This is further implemented through Director's Order 28: Cultural Resource Management, NPS *Management Policies 2006* (NPS 2006b), and the 2008 "Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the *National Historic Preservation Act*" (NPS 2008e). These documents charge NPS managers with avoiding, or minimizing to the greatest degree practicable, adverse impacts on park resources and values. Although the NPS has the discretion to allow certain impacts in parks, that discretion is limited by the statutory requirement that park resources and values remain unimpaired, unless a specific law directly provides otherwise.

METHODOLOGY AND ASSUMPTIONS

The NPS categorizes cultural resources as archeological resources, cultural landscapes, historic structures, museum objects, and ethnographic resources. As noted in the "Scoping Process and Public Participation" section in the "Purpose of and Need for Action" chapter, only impacts to archeological resources, historic structures and districts, and cultural landscapes have been retained for detailed analysis in this plan/EA.

The descriptions of effects on cultural resources that are presented in this section are intended to comply with the requirements of both NEPA and Section 106 of the *National Historic Preservation Act*. In accordance with the regulations of the Advisory Council on Historic Preservation implementing Section 106 (36 CFR 800, "Protection of Historic Properties"), impacts on cultural resources are to be identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed on or eligible to be listed on the National Register of Historic Places; (3) applying the criteria of an adverse effect to affected cultural resources either listed on or eligible to be listed on the national register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of either adverse effect or no adverse effect must also be made for affected cultural resources eligible for listing on the National Register of Historic Places. An adverse effect occurs whenever an impact alters, directly or indirectly, any of the characteristic that qualifies the resource for inclusion on the national register (for example, diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects caused by the proposal that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, "Assessment of Adverse Effects"). A determination of no adverse effect means there would either be no effect or that the effect would not diminish in any way the characteristics that qualify the cultural resource for inclusion on the National Register of Historic Places.

CEQ regulations and the NPS Director's Order 12 also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in the intensity of an impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. Cultural resources are non-renewable resources, and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under Section 106 of the *National Historic Preservation Act* may be mitigated, the effect remains adverse.

It is assumed that impacts to archeological resources from snowmobile use would only occur as a result of other motorized vehicle access because snowmobile use under any alternative is limited to the frozen surface of Blue Mesa Reservoir or the associated access points would be on the snow surface and accessed by existing roads for the single designated route.

A Section 106 summary is included at the end of the impact analysis sections for cultural landscapes and archeological resources. The Section 106 summary is an assessment of the effect of the undertaking (implementation of the alternative) only on cultural resources listed on or eligible for the National Register of Historic Places, based on the criteria of effect and criteria of adverse effect found in the regulations of the Advisory Council on Historic Preservation (36 CFR 60.4).

ARCHEOLOGICAL RESOURCES

INTENSITY THRESHOLDS

Negligible: The impact is at the lowest level of detection or barely measurable, with no perceptible consequences, either adverse or beneficial, to archeological resources. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Minor: The impact would affect an historic site, or district, or an archeological site with the potential to yield information important in prehistory or history. The historic context of the affected site(s) would be local. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Moderate: The impact would affect an archeological site with the potential to yield information important in prehistory or history. The historic context of the affected site would be statewide. For a National Register eligible or listed historic district, the impact is readily apparent, and/or changes a character-defining feature(s) of the resource to the extent that its National Register eligibility is jeopardized. For purposes of Section 106, the determination of effect would be *adverse effect*.

Major: The impact would affect an archeological site with the potential to yield important information about human history or prehistory. The historic context of the affected site would be national. The impact is severe for eligible or listed historic districts. The impact changes a character defining feature of the resource, diminishing the integrity of a National Register eligible or listed resource to the extent that it is no longer eligible or listed on the National Register. For purposes of Section 106, the determination of effect would be *adverse effect.*

IMPACT OF THE ALTERNATIVES

Alternative A: No Action (Continuation of Current Management)

Under alternative A, motorized vehicle use within the recreation area would be allowed as dictated under the Superintendent's Compendium (NPS 2009f). Designated routes, areas, and snowmobile access routes would be subject to year-round, seasonal, and/or site specific closures. A total of 61 miles of routes above the high water line and 8,239 acres below the high water line, including 7,280 acres not traditionally used, would be open to motorized vehicles. Motorized vehicle use would have impacts including soil disturbance, compaction, vegetation loss, and erosion, which in turn can lead to disturbance to surface and subsurface archeological sites. Direct impacts result from the damage or destruction that occurs when motorized vehicles drive over and/or near archeological sites. The weight and torque of such vehicles easily damages fragile surface deposits and, consequently, surface and subsurface features (e.g., remains of dwellings, burials, hearths, storage pits, and other features) as well as breaking artifacts. Site integrity, a necessary element for listing a cultural resource in the National Register of Historic Places, is also affected by the visible changes caused by vehicle tracks and erosion (Sowl and Poetter 2004). Motorized vehicles provide access to previously inaccessible, remote areas as motorized vehicle users explore new terrain (Lyneis et al. 1980). According to the BLM, motorized vehicle use leads to an increase in visitation to previously inaccessible lands and increases the intentional and inadvertent damage of archeological resources through surface disturbances (BLM 2000). Indirect impacts can occur because erosion from motorized vehicles exposes artifacts, making them susceptible to unauthorized collection (Sowl and Poetter 2004).

Alternative A would result in potential impacts to 27 prehistoric or historical archeological resources along or near open routes and areas. Fourteen (14) of these sites are considered eligible for, or are currently listed in, the National Register of Historic Places, with the potential to yield information important in prehistory or history on a local or statewide level, for which the NPS has stewardship responsibility. As a result, alternative A would have minor to moderate long-term adverse impacts on archeological resources.

Cumulative Impacts

There has been recreational ORV use in the recreation area since its establishment in 1965. Implementation of closures documented in the Superintendent's Compendium (NPS 2009f) and the 2007 OHV Interim Management Plan for Curecanti have provided protection for cultural resources in some areas. In addition, resource protection zones in the park unit's 1997 general management plan, especially

those that limit motorized vehicle access, also help protect archeological resources, as does implementation of the 2004 Disturbed Lands Inventory and Restoration Recommendations.

ORV use also occurs on adjacent public and private lands, with the majority of ORV use occurring on nearby USFS/BLM lands, which contain hundreds of miles of vehicle routes open for public use. While most of the vehicular use inside the recreation area is by typical street-legal cars and trucks, much of the vehicular use on adjacent lands involves the use of ORVs such as ATVs, jeeps, or other high-clearance vehicles. The use of vehicles off formal roads has the potential to cause adverse impacts to archeological resources similar to those described previously. Although the new BLM/USFS travel management plan will close some roads, it will continue to allow ORV use on thousands of miles of routes, and as a result, related impacts are expected to continue in the future.

The BLM Gunnison Resource Area and Uncompahgre Basin RMPs and the 1983 Grand Mesa, Uncompahgre, and Gunnison National Forest Land Management Plan mandate multiple uses of the lands they administer, including recreational opportunities, mineral development, and grazing. While these plans provide measures to manage and protect cultural resources, impacts from these uses can adversely impact archeological resources. Livestock grazing has occurred since before the establishment of the recreation area and continues to occur in numerous locations adjacent to and inside the recreation area. Grazing of sheep, cattle, and horses occurs on NPS, BLM, USFS, and private property. Depending on the intensity of the operation, livestock grazing has the potential to cause soil erosion and soil compaction, which can lead to damage to archeological resources.

Development, operation, and expansion of the Dickerson Pit granite mine in the park unit has resulted in loss of soils and some of the subsurface cultural materials within an existing archeological site that is eligible for the National Register of Historic Places. (The boundary of the archeological site was expanded during the archeological survey in 2009.) Although the donation of the mineral rights to the NPS within the site provides for continued preservation of the cultural deposits, any continued expansion of the quarry will cause long-term adverse impacts to this archeological site.

Impacts to archeological resources have been caused by other development inside and outside the park, including construction and maintenance of recreation area facilities in accordance with the 1980 general management plan, construction and maintenance of Reclamation and Western facilities, and private land development. Future development, maintenance, and expansion of such facilities could have adverse impacts on archeological resources. Maintenance of the numerous county and CDOT roads and rights-of-way in and around the recreation area also has the potential to impact archeological resources.

There has been recreational ORV use in the recreation area since its establishment in 1965. Implementation of closures documented in the Superintendent's Compendium (NPS 2009f) and the 2007 OHV Interim Management Plan for Curecanti have provided protection for soils in some areas, which in turn protects archeological resources. In addition, resource protection zones in the park unit's 1997 general management plan (NPS 1997a), especially those that limit motorized vehicle access, also help protect archeological resources.

ORV use also occurs on adjacent public and private lands, with the majority of ORV use occurring on nearby USFS/BLM lands, which contain hundreds of miles of vehicle routes open for public use. While most of the vehicular use inside the recreation area is by typical street-legal cars and trucks, much of the vehicular use on adjacent lands involves the use of ORVs such as ATVs, jeeps, or other high-clearance vehicles. The use of vehicles off formal roads has the potential to cause adverse impacts to archeological sites similar to those described previously. Although the new BLM/USFS travel management plan will close some roads, it will continue to allow ORV use on thousands of miles of routes, and as a result, related impacts to archeological resources are expected to continue in the future. The BLM Gunnison

Resource Area and Uncompahgre Basin RMPs and the 1983 Grand Mesa, Uncompahgre, and Gunnison National Forest Land Management Plan mandate multiple uses of the lands they cover, including recreational opportunities, mineral development, and grazing. While these plans provide measures to manage and protect resources such as soils, impacts from these uses contribute to adverse effects on archeological resources.

Livestock grazing has occurred since before the establishment of the recreation area and continues to occur in numerous locations adjacent to and inside the recreation area. Grazing of sheep, cattle, and horses occurs on NPS, BLM, USFS, and private property. Depending on the intensity of the operation, livestock grazing has the potential to cause soil erosion and soil compaction, which can lead to exposure and loss of cultural material.

Development, maintenance, or expansion of facilities inside and outside the recreation area, including recreation area facilities; construction and maintenance of Reclamation and Western facilities; private land development; and maintenance of CDOT roads and rights-of-way all cause disturbances that could damage cultural material and lead to exposure of archeological resources.

Although archeological resources could be affected by increased energy developments as a result of the plan to designate energy corridors on USFS/BLM lands, the corridor designated in the Gunnison area follows one of the Western transmission lines across Gunnison Basin, and any projects would likely affect previously disturbed areas or areas that have already been surveyed for cultural resources.

Despite some beneficial effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to archeological resources would be long term, minor to moderate, and adverse (impacts would be noticeable to readily apparent, and would affect some resources over a relatively large area). Actions directly related to alternative A could have detectable contributions to impacts on archeological resources.

Conclusion

Localized long-term, minor to moderate, adverse impacts on archeological resources could result from implementation of alternative A. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the minor impacts from continued motorized vehicle use under alternative A, would result in long-term, minor to moderate, adverse cumulative impacts on archeological resources. Direct impacts to archeological resources could occur if motorized vehicles drive over and/or near archeological sites. Alternative A would result in potential impacts to 27 prehistoric or historical archeological resources along or near open routes and areas. However, there would be no impairment of archeological resources under alternative A because impacts, including cumulative effects, would only affect some archeological resources, but spread over a large area. While these impacts may be noticeable in some places, there would be no change to the cultural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

Under alternative B, motorized vehicle use within the recreation area would be allowed only in areas designated as open, including routes/areas above and below the high water line of Blue Mesa Reservoir. Routes and areas in the Semi-Primitive/Non-Motorized zone of the 1997 general management plan would be closed. As a result, there would be approximately 14 miles of designated routes open to public motorized vehicles. There would also be approximately 8,239 acres below the high water line at Blue

Mesa Reservoir open to public motorized vehicles, of which 7,280 are open but not traditionally used because of access limitations created by terrain or reservoir levels.

As described for alternative A, motorized vehicle use, especially when it occurs off designated routes (either inadvertently or intentionally), causes soil disturbance, compaction, vegetation loss, and erosion. These impacts, along with the loss of soil layers, can lead to disturbance or destruction of archeological resources. As with alternative A, direct impacts can result from motorized vehicle use on or near sites, and indirect impacts can result from increased access and vandalism.

Alternative B would result in potential impacts to four archeological resources within the Curecanti Archeological District, and one site at the Dickerson Pit along or near open routes and areas. All of these sites are listed in the National Register of Historic Places, with the potential to yield information important in prehistory or history on a local or statewide level, for which the NPS has stewardship responsibility. Three sites would suffer long-term minor adverse impacts from continued use of the route; two sites would see reduced adverse impacts (i.e., long-term minor beneficial impacts) as a result of partial closure of routes. As a result, alternative B would have both long-term minor adverse and long-term minor beneficial impacts on archeological resources.

Cumulative Impacts

The same past, present, and future activities are expected under both alternative A and B. Despite some beneficial effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to archeological resources would be minor to moderate and adverse (impacts would be noticeable to readily apparent, and would affect some fossils over a relatively large area). Actions directly related to alternative B could have measurable contributions to impacts on archeological resources.

Conclusion

Although there could be localized, long-term, minor adverse effects on archeological resources along open routes and areas, there would also be long-term beneficial effects as a result of closing 47 miles of motorized vehicle access routes. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the impacts from continued motorized vehicle use under alternative B, would result in long-term, minor to moderate, adverse cumulative impacts on archeological resources. Direct impacts to archeological resources could occur if motorized vehicles drive over and/or near archeological sites. Alternative B would result in potential impacts to four archeological resources within the Curecanti Archeological District and one site at the Dickerson Pit along or near open routes and areas. Three sites would suffer long-term minor adverse impacts from continued use of the route; two sites would see reduced adverse impacts (i.e., long-term minor beneficial impacts) as a result of partial closure of routes. However, there would be no impairment of archeological resources under alternative B because impacts, including cumulative effects, would only affect some archeological resources, but over a relatively large area. There would be no change to the cultural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

Alternative C (Preferred Alternative): Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres

traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including cultural sites. Pedestrian access would be permitted in these areas, outside of resource closures.

As described in alternatives A and B, motorized vehicle use causes soil disturbance, compaction, and erosion, especially when it occurs off designated routes (either inadvertently or intentionally). Along with the loss of soil layers, these impacts can lead to disturbance or destruction of archeological resources.

Alternative C would result in potential impacts to six sites within the Curecanti Archeological District, and one site at the Dickerson Pit along or near open routes and areas. All of these sites are considered eligible for the National Register of Historic Places, with the potential to yield information important in prehistory or history on a local or statewide level, for which the NPS has stewardship responsibility. Four sites would suffer long-term minor adverse impacts from continued use of the route; two sites would see reduced adverse impacts (i.e., long-term minor beneficial impacts) as a result of partial closure of routes. Alternative C would have both long-term minor adverse and long-term minor beneficial impacts on archeological resources.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under both alternatives A, B, and C. Despite some beneficial effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to archeological resources would be minor to moderate and adverse (impacts would be noticeable to readily apparent, and would affect some resources over a relatively large area). Actions directly related to alternative C would not have measurable contributions to impacts on archeological resources.

Conclusion

Although there could be localized, long-term, negligible adverse effects on archeological resources along open routes and areas, there would also be long-term beneficial effects as a result of closing 32 miles of motorized vehicle access routes. Closing 7,280 acres below the high water line that are not traditionally used would not affect archeological resources because no known sites are located in this area. Past, present, and reasonable foreseeable future activities both inside and outside the recreation area, when combined with the long-term minor adverse and long-term minor beneficial impacts from continued motorized vehicle use under alternative C, would result in minor to moderate adverse cumulative impacts on archeological resources. Direct impacts to archeological resources could occur if motorized vehicles drive over and/or near archeological sites. Alternative C would result in potential impacts to eight sites within the Curecanti Archeological District, and one site at the Dickerson Pit along or near open routes and areas. Six sites would suffer long-term minor adverse impacts from continued use of the route; two sites would see reduced adverse impacts (i.e., long-term minor beneficial impacts) as a result of partial closure of routes. However, there would be no impairment of archeological resources under alternative B because impacts, including cumulative effects, would only affect some archeological resources, but over a relatively large area. There would be no change to the cultural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

HISTORIC STRUCTURES AND DISTRICTS

INTENSITY THRESHOLDS

Negligible: The impact is at the lowest level of detection or barely measurable, with no perceptible consequences, either adverse or beneficial, to archeological resources. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Minor: Alteration of a feature(s) would not diminish the overall integrity of the resource. The determination of effect for Section 106 would be *no adverse effect*.

Moderate: Alteration of a feature(s) would diminish the overall integrity of the resource. The determination of effect for Section 106 would be *adverse effect*. A memorandum of agreement (MOA) is executed between the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.

Major Adverse Alteration of a feature(s) would diminish the overall integrity of the resource. The determination of effect for Section 106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

IMPACT OF THE ALTERNATIVES

Alternative A: No Action (Continuation of Current Management)

Under alternative A, motorized vehicle use within the recreation area would be allowed as dictated under the Superintendent's Compendium (NPS 2009f). Designated routes, areas, and snowmobile access routes would be subject to year-round, seasonal, and/or site-specific closures. A total of 61 miles of routes above the high water line and 8,239 acres below the high water line, including 7,280 acres not traditionally used, would be open to motorized vehicle access. Motorized vehicle use could have impacts to historic cabins, ranching structures, and other historic features. Site integrity, a necessary element for listing a cultural resource in the National Register of Historic Places, is also affected by the visible changes caused by vehicle tracks and erosion (Sowl and Poetter 2004). As with archeological resources, increased access to historic structures can result in vandalism and damage to or destruction of historic features. Last, impacts occur when vibrations and soil erosion caused by mechanized vehicles undermine the stability of fragile historic structures (SUWA 2002).

During the pedestrian survey of the project routes, no historic sites were re-assessed, and one new site containing historic structures was recorded, including one historic homestead or ranch (site 5GN5632) that is considered eligible for the National Register. However, under alternative A, there would be no impacts to eligible or listed historic structures or districts. Neither the D&RG Railroad Narrow Gauge Pratt Truss Bridge (listed in the National Register) nor the associated historic railroad cars (listed in or eligible for the National Register) would be impacted by alternative A.

Cumulative Impacts

The same past, present, and reasonably foreseeable future actions described for archeological resources would contribute cumulative impacts to historic structures and districts. When combined with alternative A, the cumulative effects would be negligible. Actions directly related to alternative A would have negligible contributions to impacts on historic structures and districts.

Conclusion

Localized long-term, negligible, adverse impacts on historic structures and districts could result from implementation of alternative A. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the negligible impacts from continued motorized vehicle use under alternative A, would result in long-term, negligible adverse cumulative impacts on historic structures and districts. There would be no impairment of historic structures and districts under alternative A because impacts, including cumulative effects, would be barely measurable, with no perceptible consequences to historic structures. As a result, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

Under alternative B, motorized vehicle use within the recreation area would be allowed only in areas designated as open, including routes/areas above and below the high water line of Blue Mesa Reservoir. Routes and areas in the Semi-Primitive/Non-Motorized zone of the 1997 general management plan would be closed. As a result, there would be approximately 14 miles of designated routes open to public motorized vehicles. There would also be approximately 8,239 acres below the high water line at Blue Mesa Reservoir open to public motorized vehicles, of which 7,280 are open but not traditionally used because of access limitations created by terrain or reservoir levels.

As described for alternative A, motorized vehicle use, especially when it occurs off designated routes (either inadvertently or intentionally), can cause impacts to historic structures and features. During the pedestrian survey of the project routes, no known historic sites were re-assessed, and one new site was recorded, including one historic homestead or ranch (site 5GN5632) that is considered eligible for the National Register. However, under alternative B, there would be no impacts to eligible or listed historic structures or districts. Neither the D&RG Railroad Narrow Gauge Pratt Truss Bridge (listed in the National Register) nor the associated historic railroad cars (listed in or eligible for the National Register) would be impacted by alternative B.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under both alternatives A and B. The cumulative impacts from alternative B would be negligible. Therefore, overall cumulative effects would be negligible.

Conclusion

Localized long-term, negligible, adverse impacts on historic structures and districts could result from implementation of alternative B. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the negligible impacts from continued motorized vehicle use under alternative B would result in long-term, negligible adverse cumulative impacts on historic structures and districts. There would be no impairment of historic structures and districts under alternative B because impacts, including cumulative effects, would be barely measurable, with no perceptible

consequences to historic structures. As a result, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

Alternative C: Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including cultural sites. Pedestrian access would be permitted in these areas, outside of resource closures.

As described in alternatives A and B, motorized vehicles can cause impacts to historic structures and features, especially when off designated routes (either inadvertently or intentionally). During the pedestrian survey of the project routes, no historic sites were re-assessed, and one new site was recorded, including one historic homestead or ranch (site 5GN5632) that is considered eligible for the National Register. However, under alternative C, there would be no impacts to eligible or listed historic structures or districts. Neither the D&RG Railroad Narrow Gauge Pratt Truss Bridge (listed in the National Register) nor the associated historic railroad cars (listed in or eligible for the National Register) would be impacted by alternative C.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under both alternatives A, B, and C. The cumulative impacts from alternative C would be negligible. Therefore, overall cumulative effects would be negligible.

Conclusion

Localized long-term, negligible, adverse impacts on historic structures and districts could result from implementation of alternative C. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the negligible impacts from continued motorized vehicle use under alternative C would result in long-term, negligible adverse cumulative impacts on historic structures and districts. There would be no impairment of historic structures and districts under alternative C because impacts, including cumulative effects, would be barely measurable, with no perceptible consequences to historic structures. As a result, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

CULTURAL LANDSCAPES

INTENSITY THRESHOLDS

Negligible: Impact(s) is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be *no adverse effect*.

Minor: Alteration of a pattern(s) or feature(s) of the landscape would not diminish the overall integrity of the landscape. The determination of effect for Section 106 would be *no adverse effect*.

Moderate: Alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for Section 106 would be *adverse effect*. A memorandum of agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.

Major: Alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for Section 106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

IMPACT OF THE ALTERNATIVES

Alternative A: No Action (Continuation of Current Management)

Under alternative A, motorized vehicle use within the recreation area would be allowed as dictated under the Superintendent's Compendium (NPS 2009f). Designated routes, areas, and snowmobile access routes would be subject to year-round, seasonal, and/or site-specific closures. A total of 61 miles of routes above the high water line and 8,239 acres below the high water line, including 7,280 acres not traditionally used, would be open to motorized vehicles. Motorized vehicle use can have impacts to cultural landscapes if they are affected by the visible changes caused by vehicle tracks and erosion (Sowl and Poetter 2004). The introduction of motorized vehicles can disrupt the cultural landscape by introducing elements that are not compatible with the time period for which the landscape is designated.

Although a formal cultural landscape inventory has not been conducted, Curecanti National Recreation Area has tentatively identified the following cultural landscapes: Cooper Ranch, D&RGW Railroad, East Portal, and Enbom Sawmill. During the pedestrian survey of the project routes, no additional features were identified that could contribute to these landscapes. Use of routes proposed to be open under alternative A would have no impacts on potential cultural landscapes.

Cumulative Impacts

The same past, present, and reasonably foreseeable future actions described for archeological resources would contribute cumulative impacts to cultural landscapes. When combined with alternative A, the cumulative effects would be negligible. Actions directly related to alternative A would have negligible contributions to impacts on cultural landscapes.

Conclusion

Localized long-term, negligible, adverse impacts on cultural landscapes could result from implementation of alternative A. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the negligible impacts from continued motorized vehicle use under alternative A, would result in long-term, negligible adverse cumulative impacts on cultural landscapes. There would be no impairment of cultural landscapes under alternative A because impacts, including

cumulative effects, would be at the lowest levels of detection with neither adverse nor beneficial consequences. As a result, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

Under alternative B, motorized vehicle use within the recreation area would be allowed only in areas designated as open, including routes/areas above and below the high water line of Blue Mesa Reservoir. Routes and areas in the Semi-Primitive/Non-Motorized zone of the 1997 general management plan would be closed. As a result, there would be approximately 14 miles of designated routes open to public motorized vehicles. There would also be approximately 8,239 acres below the high water line at Blue Mesa Reservoir open to public motorized vehicles, of which 7,280 are open but not traditionally used because of access limitations created by terrain or reservoir levels.

As described for alternative A, motorized vehicle use can have impacts to cultural landscapes when it occurs off designated routes (either inadvertently or intentionally). Although a formal cultural landscape inventory has not been conducted, Curecanti National Recreation Area has tentatively identified the following cultural landscapes: Cooper Ranch, D&RGW Railroad, East Portal, and Enbom Sawmill. During the pedestrian survey of the project routes, no additional features were identified that could contribute to these landscapes. Use of routes proposed to be open under alternative B would have no impacts on potential cultural landscapes.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under both alternatives A and B. The cumulative impacts from alternative B would be negligible. Therefore, overall cumulative effects would be negligible.

Conclusion

Localized long-term, negligible, adverse impacts on cultural landscapes could result from implementation of alternative B. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the negligible impacts from continued motorized vehicle use under alternative B, would result in long-term, negligible adverse cumulative impacts on cultural landscapes. There would be no impairment of cultural landscapes under alternative B, because impacts, including cumulative effects, would be at the lowest levels of detection with neither adverse nor beneficial consequences. As a result, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

Alternative C: Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would

be closed to vehicular use to protect known and unknown resources, including cultural sites. Pedestrian access would be permitted in these areas, outside of resource closures.

As described in alternatives A and B, motorized vehicle use can have impacts to cultural landscapes when it occurs off designated routes. Although a formal cultural landscape inventory has not been conducted, Curecanti National Recreation Area has tentatively identified the following cultural landscapes: Cooper Ranch, D&RGW Railroad, East Portal, and Enbom Sawmill. During the pedestrian survey of the project routes, no additional features were identified that could contribute to these landscapes. Use of routes proposed to be open under alternative C would have no impacts on potential cultural landscapes.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under alternatives A, B, and C. The cumulative impacts from alternative C would be negligible. Therefore, overall cumulative effects would be negligible.

Conclusion

Localized long-term, negligible, adverse impacts on cultural landscapes could result from implementation of alternative C. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the negligible impacts from continued motorized vehicle use under alternative C, would result in long-term, negligible adverse cumulative impacts on cultural landscapes. There would be no impairment of cultural landscapes under alternative C because impacts, including cumulative effects, would be at the lowest levels of detection with neither adverse nor beneficial consequences. As a result, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

SECTION 106 ASSESSMENT OF EFFECT

NATIONAL HISTORIC PRESERVATION ACT SECTION 106 SUMMARY

This plan/EA analyzes the impacts of three alternatives on archeological resources, historic structures and districts, and cultural landscapes at Curecanti National Recreation Area. The alternatives include a no-action alternative and two action alternatives.

Alternative A: No Action (Continuation of Current Management)

Under alternative A, motorized vehicle use within the recreation area would be allowed as dictated under the Superintendent's Compendium (NPS 2009f). Designated routes, areas, and snowmobile access routes would be subject to year-round, seasonal, and/or site specific closures. A total of 61 miles of routes above the high water line and 8,239 acres below the high water line, including 7,280 acres not traditionally used, would be open to motorized vehicles. Motorized vehicle use would have impacts including soil disturbance, compaction, vegetation loss, and erosion, which in turn can lead to disturbance to surface and subsurface archeological sites. Direct impacts result from the damage or destruction that occurs when motorized vehicles drive over and/or near archeological sites.

Alternative A would result in potential impacts to 27 prehistoric or historical archeological resources along or near open routes and areas. Fourteen of these sites are considered eligible for, or are currently listed in, the National Register of Historic Places, with the potential to yield information important in prehistory or history on a local or statewide level, for which the NPS has stewardship responsibility. As a result, alternative A would have minor to moderate long-term adverse impacts on archeological resources.

During the pedestrian survey of the project routes, no known historic sites were re-assessed, and one new site containing historic structures was recorded, including one historic homestead or ranch (site 5GN5632) that is considered eligible for the National Register. However, under alternative A, there would be no impacts to eligible or listed historic structures or districts. Neither the D&RG Railroad Narrow Gauge Pratt Truss Bridge (listed in the National Register) nor the associated historic railroad cars (listed in or eligible for the National Register) would be impacted by alternative A.

Although a formal cultural landscape inventory has not been conducted, Curecanti National Recreation Area has tentatively identified the following cultural landscapes: Cooper Ranch, D&RGW Railroad, East Portal, and Enbom Sawmill. During the pedestrian survey of the project routes, no additional features were identified that could contribute to these landscapes. Use of routes proposed to be open under alternative A would have no impacts on potential cultural landscapes.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

Under alternative B, motorized vehicle use within the recreation area would be allowed only in areas designated as open, including routes/areas above and below the high water line of Blue Mesa Reservoir. Routes and areas in the Semi-Primitive/Non-Motorized zone of the 1997 general management plan would be closed. As a result, there would be approximately 14 miles of designated routes open to public motorized vehicles. There would also be approximately 8,239 acres below the high water line at Blue Mesa Reservoir open to public motorized vehicles, of which 7,280 are open but not traditionally used because of access limitations created by terrain or reservoir levels.

Alternative B would result in potential impacts to four archeological resources within the Curecanti Archeological District, and one site at the Dickerson Pit along or near open routes and areas. All of these sites are listed in the National Register of Historic Places, with the potential to yield information important in prehistory or history on a local or statewide level, for which the NPS has stewardship responsibility. Three sites would suffer long-term minor adverse impacts from continued use of the route; two sites would see reduced adverse impacts (i.e., long-term minor beneficial impacts) as a result of partial closure of routes. As a result, alternative B would have both long-term minor adverse and long-term minor beneficial impacts on archeological resources.

As described for alternative A, motorized vehicle use, especially when it occurs off designated routes (either inadvertently or intentionally), can cause impacts to historic structures and features. During the pedestrian survey of the project routes, no known historic sites were re-assessed, and one new site was recorded, including one historic homestead or ranch (site 5GN5632) that is considered eligible for the National Register. However, under alternative B, there would be no impacts to eligible or listed historic structures or districts. Neither the D&RG Railroad Narrow Gauge Pratt Truss Bridge (listed in the National Register) nor the associated historic railroad cars (listed in or eligible for the National Register) would be impacted by alternative B.

As described for alternative A, motorized vehicle use can have impacts to cultural landscapes when it occurs off designated routes (either inadvertently or intentionally). Although a formal cultural landscape inventory has not been conducted, Curecanti National Recreation Area has tentatively identified the following cultural landscapes: Cooper Ranch, D&RGW Railroad, East Portal, and Enbom Sawmill. During the pedestrian survey of the project routes, no additional features were identified that could contribute to these landscapes. Use of routes proposed to be open under alternative B would have no impacts on potential cultural landscapes.

Alternative C (Preferred Alternative): Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including cultural sites. Pedestrian access would be permitted in these areas, outside of resource closures.

Alternative C would result in potential impacts to six sites within the Curecanti Archeological District, and one site at the Dickerson Pit along or near open routes and areas. All of these sites are considered eligible for the National Register of Historic Places, with the potential to yield information important in prehistory or history on a local or statewide level, for which the NPS has stewardship responsibility. Four sites would suffer long-term minor adverse impacts from continued use of the route; two sites would see reduced adverse impacts (i.e., long-term minor beneficial impacts) as a result of partial closure of routes. Alternative C would have both long-term minor adverse and long-term minor beneficial impacts on archeological resources.

As described in alternatives A and B, motorized vehicles can cause impacts to historic structures and features, especially when off designated routes (either inadvertently or intentionally). During the pedestrian survey of the project routes, no known historic sites were re-assessed, and one new site was recorded, including one historic homestead or ranch (site 5GN5632) that is considered eligible for the National Register. However, under alternative B, there would be no impacts to eligible or listed historic structures or districts. Neither the D&RG Railroad Narrow Gauge Pratt Truss Bridge (listed in the National Register) nor the associated historic railroad cars (listed in or eligible for the National Register) would be impacted by alternative C.

As described in alternatives A and B, motorized vehicle use can have impacts to cultural landscapes when it occurs off designated routes. Although a formal cultural landscape inventory has not been conducted, Curecanti National Recreation Area has tentatively identified the following cultural landscapes: Cooper Ranch, D&RGW Railroad, East Portal, and Enbom Sawmill. During the pedestrian survey of the project routes, no additional features were identified that could contribute to these landscapes. Use of routes proposed to be open under alternative C would have no impacts on potential cultural landscapes.

Conclusion

In accordance with Section 106 of the *National Historic Preservation Act*, potential adverse impacts (as defined in 36 CFR 800) on archeological resources, historic structures and districts, and cultural landscapes listed on or eligible for listing on the National Register of Historic Places would be coordinated between the National Park Service and the State Historic Preservation Officer to determine the level of effect on the property and to determine any necessary mitigation measures. Continuing implementation of the Cultural Resource Management Guideline (NPS 1997b) and adherence to NPS *Management Policies 2006* (NPS 2006b) and the 2008 Servicewide programmatic agreement with the Advisory Council on Historic Preservation and National Conference of State Historic Preservation Officers (NPS 2008e) would all aid in reducing the potential to adversely impact historic properties.

Copies of this plan/EA have been distributed to the Colorado State Historic Preservation Officer for review and comment related to compliance with Section 106 of the *National Historic Preservation Act*.

VISITOR USE AND EXPERIENCE

GUIDING REGULATIONS AND POLICIES

NPS *Management Policies 2006* (NPS 2006b, sec. 8.2) states that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the National Park Service is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. Because many forms of recreation can take place outside a national park setting, the National Park Service will therefore seek to:

- provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the parks;
- defer to local, state, and other federal agencies; private industry; and non-governmental organizations to meet the broader spectrum of recreational needs and demands.

To provide for enjoyment of the parks, the National Park Service will encourage visitor activities that

- are appropriate to the purpose for which the park was established; and
- are inspirational, educational, or healthful, and otherwise appropriate to the park environment; and
- will foster an understanding of and appreciation for park resources and values, or will promote enjoyment through a direct association with, interaction with, or relation to park resources; and
- can be sustained without causing unacceptable impacts to park resources or values.

Part of the purpose of Curecanti National Recreation Area is to offer opportunities for recreation, education, inspiration, and enjoyment. Its significance lies in the spectacular and diverse scenic, recreation and cultural resources that visitors enjoy. One of the national recreation area's mission goals is to ensure that "Visitors safely enjoy and are satisfied with the availability, accessibility, diversity and quality of park facilities, services and appropriate recreational opportunities." To achieve this mission goal, a long-term (five-year) visitor goal was identified in the Strategic Plan (NPS 2008f):

> *Visitor Satisfaction* — By September 30, 2012, 95% of visitors to Curecanti National Recreation Area are satisfied with appropriate park facilities, services, and recreational opportunities.

The goal focuses on maintaining high visitor satisfaction by means of appropriate recreational opportunities and experiences.

The authorizing memorandum of agreement between Reclamation and the NPS directs the NPS to "provide public recreational facilities; to conserve the scenery, the natural, historic, and archeological objects, and the wildlife; to provide for public use and enjoyment of the lands and water areas at Curecanti by such means as are consistent with the primary purposes of the overall project; and to provide facilities to mitigate losses of, and improve conditions for, the propagation of fish and wildlife."

METHODOLOGY, ASSUMPTIONS, AND IMPACT THRESHOLDS

The purpose of this impact analysis is to evaluate the potential for change in visitor use and experience by identifying projected increases or decreases in both motorized vehicle use and other visitor uses, and determining whether these projected changes would affect the desired visitor experience.

To determine impacts, the current and projected level of motorized vehicle use was analyzed for the recreation area. Staff observations were evaluated to determine visitor attitudes and satisfaction in areas where motorized vehicles are used.

Negligible: Visitors would likely be unaware of impacts associated with proposed changes. There would be no noticeable change in recreational opportunities or in any defined indicators of visitor satisfaction or behavior.

Minor: Changes in recreational opportunities or visitor use or experience would be slight and detectable, but would not appreciably limit or enhance any critical characteristics of the visitor experience. Visitor satisfaction would remain stable.

Moderate: A few critical characteristics of the existing visitor experience would change, and the number of visitors engaging in a specified recreational activity would be altered. Some visitors participating in that activity or visitor experience might be required to pursue their choices in other available local or regional areas. Visitor satisfaction at the recreation area would begin to either decline or increase.

Major: Many critical characteristics of the existing visitor experience would change, and visitor satisfaction would be substantially decreased or enhanced. The number of visitors engaging in a specified recreational activity would be substantially altered. Many visitors participating in an activity or visitor experience would not be able to pursue their choices in other areas.

Duration: Short-term — Impacts would occur sporadically throughout a year, but would generally last no more than 3 weeks per year.

Long-term — Impacts would occur more than 3 weeks per year.

IMPACT OF THE ALTERNATIVES

Alternative A: No Action (Continuation of Current Management)

Under alternative A, motorized vehicle use within the recreation area would be allowed as described in the Superintendent's Compendium (NPS 2009f) and the OHV Interim Management Plan. Designated routes, areas, and snowmobile access routes would be subject to year-round, seasonal, and/or site-specific closures, as stated in the existing rules for snowmobiles (36 CFR 7.51c). A total of 61 miles of routes above the high water line and 8,239 acres below the high water line, including 7,280 acres not traditionally used by motorized vehicles, would be open to motorized vehicles. Per the OHV Interim Management Plan, motorized vehicle closures would be implemented based on testing that reveals a potential for disturbance of cultural resources due to vehicle travel. This testing would occur as funding is available, and may not occur within the foreseeable future. Under alternative A there would be no change to the current visitor use, experience, access, or recreational opportunities. As a result, there would be no change for visitors, and impacts to visitor use and experience would be long term, negligible, and adverse.

Cumulative Impacts

Other past, present, and planned future actions within the recreation area have the potential to affect visitors' use and experience supported within the recreation area. Many of these actions have beneficial impacts on visitor use and experience, although some have both beneficial and adverse effects.

Beneficial impacts to visitor use and experience have occurred, and would continue to occur into the future, from the implementation of the 1980 and 1997 general management plans, the OHV Interim Management Plan, and past and ongoing travel management plans for adjacent lands. These plans provide for developed facilities for public use; address various resource protection issues related to recreational use, including visitor use and lands (ensuring quality visitor experience and resource conservation); and provide guidelines for managing motorized vehicle access. Concessions and commercial services at the recreation area also have beneficial impacts to visitor use and experience by providing access to a variety of recreational opportunities.

There has been recreational ORV use in the recreation area since its establishment in 1965. ORV use also occurs on adjacent public and private lands, with the majority of ORV use occurring on nearby USFS/BLM lands, which contain hundreds of miles of vehicle routes open for public use. While most of the vehicular use inside the recreation area is by typical street-legal cars and trucks, much of the vehicular use on adjacent lands involves the use of ORVs such as ATVs, jeeps, or other high-clearance vehicles. The use of vehicles off formal roads has long-term beneficial effects for visitors who desire to use ORVs. However, their use has the potential to cause conflicts with other visitors, as well as increased noise that emanates from the vehicles, which would result in adverse impacts to the visitor experience of some.

Regulations governing the operation of PWCs, snowmobiles, and boats have the potential to have adverse impacts on visitor use and experience as a result of increased rules regarding equipment requirements, permits, inspections, and fees which may inconvenience some visitors and restrict where they can use PWCs. However, these regulations have the potential to have beneficial impacts to visitor use and experience due to improved and prolonged management of PWCs and snowmobiles, which would reduce visitor conflicts and improve visitor safety.

Hunting within and adjacent to the recreation area has the potential for both adverse and beneficial impacts to visitor use and experience. Visitors who dislike hunting and/or the sound of firearms while visiting the recreation area may experience adverse impacts from hunting within or adjacent to the recreation area; however, visitors who enjoy hunting would experience beneficial impacts as a result of increasing their recreational opportunities within and adjacent to the recreation area.

The Invasive Mussel Prevention Program requires all motorized watercraft launching in the recreation area to be inspected for invasive mussels and, if necessary, decontaminated in accordance with procedures set by the Colorado Division of Wildlife. These requirements have the potential to adversely affect visitor use and enjoyment of the recreation area due to the time it takes for watercraft to be inspected. However, these requirements also have the potential to beneficially affect visitor use and enjoyment of the recreation area as a result of preventing invasive mussels from entering the reservoir and affecting aquatic resources and visitor safety.

As a result of the anticipated increase in demand for additional and more diverse recreational activities, visitor use and experience may experience a beneficial impact if the recreation area provides for new, diverse recreational opportunities that have been identified as appropriate. However, if visitation to the recreation area increases to the point of overcrowding, visitor use and experience could experience adverse impacts.

The construction and management of Western/Reclamation facilities has the potential for adverse impacts to visitor use and experience as a result of restricted public access to these areas, as well as the associated maintenance/construction noise; however, beneficial impacts would result as the dams and reservoirs are improved for future uses.

Current mining operations at the Dickerson Pit, as well as expanded future operations, have the potential to adversely affect visitor use and experience as a result of restricted public access and noise associated with mining operations.

The 1993 Gunnison Resource Area RMP and 1989 Uncompahgre Basin RMP have the potential to have beneficial impacts to visitor use and experience as a result of management for sustained use; however, these plans also have the potential to have adverse impacts on visitor use and experience for those visitors wishing to enjoy quiet and solitude within the recreation area.

Legislation to expand the West Elk Wilderness Area has been proposed since 1999. The proposed wilderness addition would include the area of land between Coal Creek and Red Creek and would create a continuous wilderness from US Highway 50 north almost to the Kebler Pass Road. If this addition to the wilderness area were to be designated, it could adversely affect the recreational opportunities in the area due to the restrictions and resulting closures of areas to motorized vehicle use.

Despite some adverse effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to visitor use and experience would be short term and long term, and beneficial. Actions directly related to alternative A would have negligible contributions to impacts on visitor use and experience.

Conclusion

Long-term, negligible, adverse impacts on visitor use and experience could result from implementation of alternative A. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the long-term, negligible, adverse impacts from continued motorized vehicle use under alternative A, would result in short- and long-term beneficial cumulative impacts on visitor use and experience.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

Under alternative B, motorized vehicle use within the recreation area would be allowed only in areas designated as open, including routes/areas above and below the high water line of Blue Mesa Reservoir. Routes and areas in the Semi-Primitive/Non-Motorized zone of the 1997 general management plan that are currently open to motorized vehicle use would be closed. As a result, there would be approximately 14 miles of designated routes open to public motorized vehicles. There would also be approximately 8,239 acres below the high water line at Blue Mesa Reservoir open to public motorized vehicles, of which 7,280 are not traditionally used because of access limitations created by terrain or reservoir levels.

Closing routes that provide access to the south shore of Blue Mesa Reservoir could cause an increase in vehicle use of the north shore and any associated access routes. However, the south shore is only accessible for a short period of time in the early spring before reservoir levels rise, so an increase in use of the north shore would be temporary and would occur outside the high visitor use season (June, July, and August). The other routes closed under alternative B either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in

their planning effort. These routes are not heavily used, and their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

Regardless, these closures would limit access routes to the reservoir and other sections of the recreation area, and would have detectable effects on recreational opportunities at the park unit. This could cause a decline in visitor satisfaction for some users, although it is not likely this would cause visitors to seek recreational opportunities outside the park. Consequently, under alternative B, impacts to visitor use and experience within the recreation area would be long term, minor to moderate, and adverse (impacts would be readily apparent and measurable) as a result of the closure of approximately 47 of previously open motorized vehicle access routes.

However, those visitors wishing to experience quiet and solitude within the recreation area could benefit from the absence of traditional motorized vehicle access routes, as a result of less noise and decreased visual impacts from motorized vehicles. As suggested by McCool (1979), visual impacts from motorized vehicle use on unpaved surfaces lasts longer in arid environments, where soil stability is inherently more tenuous. The compounding factors of motorized vehicle activities, wind erosion, and increased runoff from the resulting loss of vegetation can have substantial impacts on the aesthetic character of such arid regions (McCool 1979). For those visitors wishing to enjoy the quiet and solitude of the recreation area, impacts to visitor experience under alternative B would be beneficial. Implementing speed limits and providing additional snowmobile access points (and thereby reducing travel distances to access points) would contribute to these beneficial impacts by reducing overall vehicular noise. Therefore, alternative B would have long-term minor to moderate adverse impacts on some park users and long-term beneficial impacts on others.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under both alternatives A and B. Despite some long-term beneficial effects of alternative B for some users, it would also have long-term minor to moderate adverse impacts on others. As a result, the cumulative impacts would be similar to those from alternative A, and overall effects would be long term and beneficial.

Conclusion

Long-term minor to moderate adverse impacts on visitor use and experience could result from implementation of alternative B for some users. However, there would also be long-term beneficial effects for users seeking opportunities for quiet and solitude. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area would result in short- and long-term beneficial cumulative impacts when combined with alternative B.

Alternative C (Preferred Alternative): Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including cultural sites. Pedestrian access would be permitted in these areas, outside of resource closures.

Closing areas below the high water line of Blue Mesa Reservoir that are not traditionally used would not cause any changes to visitor use and experience. The other routes closed under alternative C either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in their planning effort. These routes are not heavily used, and as a result, their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

Regardless, these closures would have detectable effects on recreational opportunities at the park unit. However, given the nature of these routes, it is not likely that visitor satisfaction would change or that visitors would seek recreational opportunities in other places. Consequently, under alternative C impacts to visitor use and experience within the recreation area would be long term, minor, and adverse.

Additionally, those visitors wishing to experience quiet and solitude within the recreation area could benefit from the absence of traditional motorized vehicle access routes, as a result of less noise and decreased visual impacts from motorized vehicles. As suggested by McCool (1979), visual impacts from motorized vehicle use on unpaved surfaces lasts longer in arid environments, where soil stability is inherently more tenuous. The compounding factors of motorized vehicle activities, wind erosion, and increased runoff from the resulting loss of vegetation can have major impacts on the aesthetic character of such arid regions (McCool 1979). Implementing speed limits and providing additional snowmobile access points (and thereby reducing travel distances to and from access points) would contribute to these beneficial impacts by reducing overall vehicular noise. Therefore, alternative C would have long-term minor to moderate adverse impacts on some park users and long-term beneficial impacts on others.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under alternatives A, B, and C. Despite some long-term beneficial effects of alternative C for some users, it would also have long-term minor to moderate adverse impacts on others. As a result, the cumulative impacts would be similar to those from alternative A, and overall effects would be long term and beneficial.

Conclusion

Long-term minor adverse impacts on visitor use and experience could result from implementation of alternative C for some users. However, there would also be long-term beneficial effects for users seeking opportunities for quiet and solitude. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area would result in short- and long-term beneficial cumulative impacts when combined with alternative C.

VEGETATION

GUIDING REGULATIONS AND POLICIES

The NPS *Organic Act of 1916* and the NPS *Management Policies 2006* (NPS 2006b) direct parks to provide for the protection of park resources. NPS *Management Policies 2006* (2006b) state that the NPS will minimize human impacts on native plants (and animals); their populations, communities, and ecosystems; and the processes that sustain them (sec. 4.4.1). In addition, NPS *Management Policies 2006* prohibits the displacement of native species by exotic species if displacement can be prevented (sec. 4.4.4). Recognizing the influence of external factors on natural resources in the park, section 4 of the NPS *Management Policies 2006* also calls for the NPS to protect natural resources by working cooperatively with federal, state, and local agencies; tribal authorities; user groups; adjacent landowners; and others to identify and achieve broad natural resource goals.

METHODOLOGY, ASSUMPTIONS, AND IMPACT THRESHOLDS

Past vegetation classification data and maps showing vegetation cover within Curecanti National Recreation Area were used to identify baseline conditions within the study area. Based on discussions with park and other NPS staff, vegetation types were grouped into 16 map units as described in the "Vegetation" section of the "Affected Environment" chapter. Digital maps of the alternatives and vegetation were analyzed using GIS software to evaluate which vegetation types could be affected by open routes and areas. Comparisons were then made between alternative A and alternatives B and C (the action alternatives) to determine if there was a difference in vegetation communities with open routes/areas. In addition, potential indirect impacts were assessed, such as the potential for motorized vehicle access to introduce seeds of non-native vegetation, or create other conditions suitable for the establishment of non-natives. It is assumed that impacts to vegetation from snowmobile use would only occur as a result of other motorized vehicle access because snowmobile use under any alternative is limited to the frozen surface of Blue Mesa Reservoir or the associated access points would be on the snow surface and accessed by existing roads for the single designated route.

Because NPS *Management Policies 2006* (NPS 2006b) requires the NPS to minimize not only impacts to individual native plants, but also to their populations, communities, ecosystems, and the processes that sustain them, the thresholds for impact intensity, defined as follows, consider all such effects:

Negligible: No native vegetation would be affected or some individual native plants could be affected in localized areas. The abundance or distribution of vegetation would not be affected or would be slightly affected. Ecological processes and biological productivity would not be affected.

Minor: The alternative would affect the abundance or distribution of individual plants in a localized area, but would not affect the viability of local or regional populations or associated communities. Mitigation to offset adverse effects, such as revegetation and weed control would be necessary and would be effective.

Moderate: The alternative would affect some individual native plant communities and the loss or disturbance of vegetation would be readily noticeable and measurable. Ecological and biological productivity would be disrupted in the disturbed area. Mitigation to offset adverse effects, such as revegetation and weed control would be necessary and would likely be successful.

Major: The alternative would have a considerable effect on native plant populations and affect a relatively large area. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

Duration: Short-term — Recovery would take less than 1 year.

Long-term — Following project completion, recovery would take more than 1 year.

IMPACT OF THE ALTERNATIVES

Alternative A: No Action (Continuation of Current Management)

Under alternative A, impacts to vegetation could occur along the 61 miles of open motorized vehicle access routes above the high water line, as well as the 8,239 acres open below the high water line (including 7,280 acres not traditionally used). Travel off established routes, whether inadvertent or intentional, damages vegetation, and as a result, open motorized vehicle access routes under alternative A are generally devoid of vegetation due to use over the years (NPS 2007a, 4). Impacts identified in a study of off-road motorized vehicle travel in western states (Wilshire et al. 1978) included the crushing of foliage, stems, root systems, and seedlings; uprooting of small plant cover; and disruption of root systems of larger plants. This study also noted that off-road motorized vehicle travel has even destroyed juniper trees more than 10 feet tall. These impacts have been documented to occur not only where vehicles directly contact vegetation, but also beyond the vehicle track width (Wilshire et al. 1978; Lathrop 1983). Although some studies in arid environments have documented loss of vegetation with a small number of passes by ORVs (Wilshire 1983; Webb 1983), others have shown that the most pronounced effects occur in localized areas as a result of concentrated use (such as heavy weekend use) (Lathrop 1983).

Other vegetation impacts could occur as a result of the erosion and physical changes to soils that occur from off-road motorized vehicle travel (see "Soils" analysis in this chapter). Erosion that creates gullies can undercut and cause the loss of vegetation, including plants that are lost as soil from surrounding high spots is eroded and deposited into the low spots. Additional runoff that results from the loss of vegetation (either directly or from erosion) is commonly diverted to unused slopes, which can increase erosion and subsequent loss of vegetation in nearby areas that are not even open to motorized vehicle access. Ultimately, the deposition of the eroded materials buries vegetation, causing further plant loss (Wilshire et al. 1978).

The loss of more fertile layers of the soil, as well as the reduction in productivity (see "Soils" analysis in this chapter), adds to the impacts on vegetation by slowing restoration of disturbed areas (Wilshire et al. 1978). In arid environments such as those at Curecanti, natural recovery of disturbed areas can take many years. In one study in Nevada, partial recovery of vegetation—which was primarily exotic species—and associated soil cover took a minimum of one year (Webb 1982).

In addition to impacts associated with damage to vegetation, motorized vehicle access also has the potential to introduce or spread non-native plants. Literature reviewed for this plan/EA addressed both the effects of roads on the spread of invasive species and the potential for seed transport. Gelbard and Belnap (2003) documented that roads and associated environmental disturbances contributed to the spread of invasive species in semiarid grasslands, shrublands, and woodlands of southern Utah, although cover and exotic species richness was lower near four-wheel-drive tracks than paved roads. A study conducted by the Montana Weed Control Association (Trunkle and Fay 1991) documented dispersal of plant material from the undercarriage of vehicles, including spotted knapweed (*Centaurea stoebe*) seeds. The results of the study indicated that spotted knapweed seed is readily disseminated by motor vehicles over long distances. Another study (Rooney 2005) compared soil samples taken from the undercarriages of motorized vehicles to field surveys for seven invasive species in forested areas of Wisconsin. The study found that off-road motorized vehicle access may occasionally contribute to long-distance dispersal events. Similarly, researchers investigated the potential for seed transport into Kakadu National Park, Australia, by tourist vehicles. The study identified a low density of seeds on vehicles, and concluded that vehicles were partially responsible for weed seed dispersal, but that this did not warrant preventive measures (Osborn et al. 2002).

Routes and areas open for motorized vehicle access under alternative A are found in a variety of the vegetation types described in the "Affected Environment" chapter including aspen forest, Douglas-fir woodland/forest, Gambel oak shrubland, pinyon-juniper woodland, canyon woodland, riparian vegetation, rock spirea sparsely vegetated rock outcrop, sagebrush shrubland, vegetation, shale barren mixed vegetation, upland herbaceous, wet herbaceous, and semi-natural herbaceous. Although other vegetation types occur on the fringe of the high water line of Blue Mesa Reservoir, this area, which sees the heaviest motorized vehicle use, is composed primarily of the semi-natural herbaceous plant communities. Motorized vehicle access in the area below the high water line has the potential to cause damage and loss of plants in this vegetation type, especially if vehicles get stuck in vegetated areas, but recovery would occur by the next growing season as a result of the periodic inundation of the area as the reservoir fills. Areas above the high water line that support the other plant communities noted above would take more time to recover from motorized vehicle travel off designated routes, whether intentional or not.

Any damage or loss of vegetation, which would be more noticeable above the high water line due to longer recovery rates, would only result in a change in abundance or distribution of individual plants within the vicinity of routes and areas designated as open. These localized impacts would not affect overall population numbers or ecological or biological processes to the point that viability and stability of the plant communities would be compromised. Also, as described previously, motorized vehicle access has the potential to introduce or spread non-native plants. However, as discussed in the "Invasive Species" section of the "Affected Environment" chapter, the NPS actively manages non-native plants, and any efforts required to offset their introduction or spread as a result of motorized vehicle access would likely be successful. Therefore, impacts to vegetation from motorized vehicle access under alternative A would be short term (below the high water line) and long term (above the high water line), minor, adverse, and generally localized.

Cumulative Impacts

There has been recreational ORV use in the recreation area since its establishment in 1965. Implementation of closures documented in the Superintendent's Compendium (NPS 2009f) and the 2007 OHV Interim Management Plan for Curecanti has provided protection for vegetation in some areas. In addition, resource protection zones in the park unit's 1997 general management plan (NPS 1997a), especially those that limit motorized vehicle access, also help protect vegetation, as does implementation of the 2004 Disturbed Lands Inventory and Restoration Recommendations.

Past suppression of all fires at Curecanti National Recreation Area removed a component of the ecosystem that plays an important role in the evolution and establishment of many plant communities. Fire removes natural fuel accumulations and assists in the control of insects and disease within many plant communities. Left unchecked, fuel accumulations provide increased potential for damage to plant vigor and rejuvenation. However, in 2006, the NPS developed a fire management plan (NPS 2006g) that calls for the use of wildland fire and prescribed burns, to the extent practicable, to restore this ecological process. As the fire management plan describes, fire is a valuable tool for perpetuating native plant life and maintaining or restoring indigenous flora and natural communities to achieve species diversity and community structure similar to those that would occur under natural conditions (NPS 2006g). Invasive, non-native vegetation control, per the noxious weed operating plan developed annually by the NPS and Gunnison County, also helps restore and perpetuate native plants and plant communities at Curecanti National Recreation Area.

Although they are wildlife management plans, initiatives such as the Gunnison sage-grouse conservation plans and the conservation strategy for Colorado Gunnison's and white-tailed prairie dogs also help protect vegetation. These initiatives all seek to promote conservation of these species and their habitat, and recommend strategies that would benefit plants and plant communities in or near the park, such as

vegetation treatments, livestock management, big game management, initiation of fire regimes, native grass reseeding, and/or control of non-native vegetation.

ORV use also occurs on adjacent public and private lands with the majority of off-road use occurring on nearby USFS/BLM lands, which contain hundreds of miles of vehicle routes open for public use. While most of the vehicular use inside the recreation area is by typical street-legal cars and trucks, much of the vehicular use on adjacent lands involves the use of ORVs such as ATVs, jeeps, or other high-clearance vehicles. The use of vehicles off formal roads has the potential to cause adverse impacts to vegetation similar to those described previously. Although the new BLM/USFS travel management plan will close some roads, it will continue to allow ORV use on thousands of miles of routes, and as a result, related impacts are expected to continue in the future.

The BLM Gunnison Resource Area and Uncompahgre Basin RMPs and the 1983 Grand Mesa, Uncompahgre, and Gunnison National Forest Plan mandate multiple uses of the lands they cover, including recreational opportunities, mineral development, and grazing. While these plans provide measures to manage and protect resources such as vegetation, impacts from these uses contribute to vegetation loss and damage.

Livestock grazing has occurred since before the establishment of the recreation area and continues to occur in numerous locations adjacent to and inside the recreation area. Grazing of sheep, cattle, and horses occurs on NPS, BLM, USFS, and private property. Depending on the intensity of the operation, livestock grazing has the potential to cause damage and/or loss of native vegetation, and facilitate the establishment and/or spread of non-natives. In addition to grazing, development, operation, and expansion of the Dickerson Pit granite mine in the park unit has impacted vegetation.

Development inside and outside the parks has caused vegetation loss including construction and maintenance of recreation area facilities in accordance with the 1980 general management plan, construction and maintenance of Reclamation and Western facilities, and private land development. Future development, maintenance, and expansion of such facilities could have adverse impacts on vegetation. Maintenance of the numerous county and CDOT roads and rights-of-way in and around the recreation area also has the potential to affect vegetation along these corridors.

Although increased energy developments could occur as a result of the plan to designate energy corridors on USFS/BLM lands, the corridor designated in the Gunnison area follows one of the Western transmission lines across Gunnison Basin, and any projects would likely affect previously disturbed areas.

Despite some beneficial effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to vegetation are short term and long term, moderate, and adverse (impacts are noticeable and measurable in some areas, and actions such as development have affected ecological and biological productivity). Actions directly related to alternative A would have minor contributions to impacts on vegetation.

Conclusion

Short- and long-term minor adverse effects on vegetation could occur as a result of localized impacts including damage to plants; erosion that can cause further loss of vegetation; impacts on soil productivity that can affect natural recovery; and the potential introduction or spread of non-native plants. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the short- and long-term minor adverse impacts from continued motorized vehicle use under alternative A, would result in short- and long-term, moderate, adverse cumulative impacts on vegetation. There would be no impairment of vegetation under alternative A, because impacts, including cumulative effects, would not have considerable effects on native plant populations over a large area.

Impacts would be localized and would not affect overall population numbers or ecological or biological processes to the point that viability and stability of the plant communities would be compromised. Motorized vehicle access below the high water line has the potential to cause damage and loss of herbaceous plants but recovery would occur by the next growing season as a result of the periodic inundation of the area as the reservoir fills. Damaged vegetation above the high water line would take more time to recover from motorized vehicle travel off designated routes, whether intentional or not. Overall, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established, or other resource management goals.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

Under alternative B, approximately 14 miles of designated routes would be open to public motorized vehicles, in addition to approximately 8,239 acres below the high water line at Blue Mesa Reservoir (of which 7,280 are open but not traditionally used because of access limitations created by terrain or reservoir levels). Routes that would be closed to the public because of the general management plan prescriptions include power line access roads and spurs to the reservoir found on the south side of Blue Mesa, as well as miscellaneous routes that do not necessarily provide access for other recreational opportunities at the park. Other routes that would be closed include those that tie into BLM/USFS routes that have been recommended for closure in their travel management planning process, or those that are not generally used to access other recreational opportunities at the park.

Open routes and areas under alternative B would occur in the following vegetation types: Gambel oak shrubland, pinyon-juniper woodland, riparian vegetation, sagebrush shrubland, shale barren mixed vegetation, upland herbaceous, and semi-natural herbaceous.

As described for alternative A, motorized vehicle use, especially when it occurs off designated routes (either inadvertently or intentionally), causes damage to vegetation; results in erosion, which can cause further loss of vegetation; impacts soil productivity, which can affect natural recovery; and creates the potential for the introduction or spread of non-native plants. However, under alternative B, the NPS would establish and enforce vehicle track width requirements that would reduce the potential for motorized vehicles to have impacts on vegetation along existing routes that remain open.

Closing routes that provide access to the south shore of Blue Mesa Reservoir could cause an increase in vehicle use of the north shore and any associated access routes. However, the south shore is only accessible for a short period of time in the early spring before reservoir levels rise, so an increase in use of the north shore would be temporary and would occur outside the high visitor use season (June, July, and August). As a result, there would be limited potential for an increase in vegetation impacts in this area as compared to alternative A.

The other routes closed under alternative B either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in their planning effort. These routes are not heavily used, and their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

As a result, impacts from motorized vehicle access would be short term and long term, minor, and adverse. As described for alternative A, these impacts would be localized in the vicinity of motorized vehicle access routes/areas and would not affect the population numbers, ecological or biological processes, or overall viability and stability of the plant communities. Impacts would be short term below the high water line of Blue Mesa Reservoir because of the seasonal fluctuations in reservoir levels.

Impacts above the high water line would be long term because of the lengthy recovery period for vegetation found in arid environments.

However, these impacts would occur in fewer vegetation types as compared to alternative A, as approximately 47 miles of motorized vehicle access routes would be closed (access below the high water line at Blue Mesa Reservoir would remain the same). Removing the potential for plant damage and loss associated with motorized vehicle access in aspen forest, Douglas-fir woodland/forest, canyon woodland, rock spirea sparsely vegetated rock outcrop, and wet herbaceous vegetation types would have long-term beneficial effects for these plant communities. Beneficial effects would also occur by allowing closed routes to recover; actively rehabilitating them if funding is available; and educating visitors about driving below the high water line, how to avoid getting stuck, and how to dig out without causing major soil damage.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under both alternatives A and B. The cumulative impacts from alternative B would be similar to those from alternative A because the beneficial long-term impacts on vegetation from alternative B would only slightly offset some of the adverse cumulative impacts. Therefore, overall cumulative effects would continue to be short term and long term, moderate, and adverse.

Conclusion

Localized, short- and long-term, negligible to minor adverse impacts on vegetation could occur in areas open to motorized vehicle access. The impacts would occur in fewer vegetation types, as approximately 47 miles of motorized vehicle access routes would be closed as compared to alternative A (access below the high water line at Blue Mesa Reservoir would remain the same). These closed routes would be allowed to recover or would be rehabilitated if funding is available. As a result, there would be long-term beneficial impacts to vegetation associated with closed routes. Establishing and enforcing vehicle track width requirements and educating visitors about driving below the high water line would contribute to these beneficial impacts. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the short- and long-term negligible to minor adverse impacts from continued motorized vehicle use under alternative B, would result in short- and long-term, moderate, adverse cumulative impacts on vegetation. There would be no impairment of vegetation under alternative B, because impacts, including cumulative effects, would not have considerable effects on native plant populations over a large area. Impacts would be localized and would not affect overall population numbers or ecological or biological processes to the point that viability and stability of the plant communities would be compromised. Motorized vehicle access below the high water line has the potential to cause damage and loss of herbaceous plants but recovery would occur by the next growing season as a result of the periodic inundation of the area as the reservoir fills. Damaged vegetation above the high water line would take more time to recover from motorized vehicle travel off designated routes, whether intentional or not. Overall, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established, or other resource management goals.

Alternative C (Preferred Alternative): Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general

management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including cultural sites. Pedestrian access would be permitted in these areas, outside of resource closures.

Open routes and areas under alternative C would occur in the following vegetation types: Gambel oak shrubland, pinyon-juniper woodland, riparian vegetation, sagebrush shrubland, shale barren mixed vegetation, and upland herbaceous.

As described for alternative A, motorized vehicle use, especially when it occurs off designated routes (either inadvertently or intentionally), causes damage to vegetation; results in erosion, which can cause further loss of vegetation; impacts soil productivity, which can affect natural recovery; and creates the potential for the introduction or spread of non-native plants. However, under alternative C, the NPS would establish and enforce vehicle track width requirements that would reduce the potential for motorized vehicles to have impacts on vegetation along existing routes that remain open. Closing areas below the high water line of Blue Mesa Reservoir that are not traditionally used would not cause any changes in visitation patterns that would affect vegetation. The routes closed under alternative C either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in their planning effort. These routes are not heavily used, and as a result, their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

As a result, impacts from motorized vehicle access would be short term and long term, negligible to minor, and adverse. As described for alternative A, these impacts would be localized in the vicinity of motorized vehicle access routes/areas and would not affect the population numbers, ecological or biological processes, or overall viability and stability of the plant communities. Impacts would be short term below the high water line of Blue Mesa Reservoir because of the seasonal fluctuations in reservoir levels. Impacts above the high water line would be long term because of the lengthy recovery period for vegetation found in arid environments.

However, these impacts would occur in fewer vegetation types as compared to alternative A, as approximately 32 miles of motorized vehicle access routes would be closed. Approximately 7,280 acres of area not traditionally used below the high water line would also be closed. Removing the potential for plant damage and loss associated with motorized vehicle access in aspen forest, Douglas-fir woodland/forest, canyon woodland, rock spirea sparsely vegetated rock outcrop, and wet herbaceous, and vegetation types would have long-term beneficial effects for these plant communities. Although these areas are not traditionally used, closing areas below the high water line would contribute to beneficial effects by limiting any potential future use of these areas. Beneficial effects would also occur by allowing closed routes to recover; actively rehabilitating them if funding is available; and educating visitors about driving below the high water line, how to avoid getting stuck, and how to dig out without causing major soil damage.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under both alternatives A and C. The cumulative impacts from alternative C would be similar to those from alternative A because the beneficial long-term impacts on vegetation from alternative C would only slightly offset some of the adverse cumulative impacts. Therefore, overall cumulative effects would continue to be short term and long term, moderate, and adverse.

Conclusion

Localized, short- and long-term, negligible to minor adverse impacts on vegetation could occur in areas open to motorized vehicles. The impacts would occur in fewer vegetation types, as 32 miles of motorized vehicle access routes would be closed as compared to alternative A. These closed areas would be allowed to recover or would be rehabilitated if funding is available. In addition, although these areas are not traditionally used, closing 7,280 acres below the high water line at Blue Mesa Reservoir would remove the potential for impacts to vegetation from motorized vehicle access in these areas. As a result, there would be long-term beneficial impacts to vegetation associated with closed routes and areas. Establishing and enforcing vehicle track width requirements and educating visitors about driving below the high water line would contribute to these beneficial impacts. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the short- and long-term negligible to minor adverse impacts from continued motorized vehicle use under alternative C, would result in short- and long-term, moderate, adverse cumulative impacts on vegetation. There would be no impairment of vegetation under alternative C, because impacts, including cumulative effects, would not have considerable effects on native plant populations over a large area. Impacts would be localized and would not affect overall population numbers or ecological or biological processes to the point that viability and stability of the plant communities would be compromised. Motorized vehicle access below the high water line has the potential to cause damage and loss of herbaceous plants but recovery would occur by the next growing season as a result of the periodic inundation of the area as the reservoir fills. Damaged vegetation above the high water line would take more time to recover from motorized vehicle travel off designated routes, whether intentional or not. Overall, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established, or other resource management goals.

WILDLIFE AND WILDLIFE HABITAT

GUIDING REGULATIONS AND POLICIES

NPS *Management Policies 2006* states the NPS "will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems. The term 'plants and animals' refers to all five of the commonly recognized kingdoms of living things and includes such groups as flowering plants, ferns, mosses, lichens, algae, fungi, bacteria, mammals, birds, reptiles, amphibians, fishes, insects, worms, crustaceans, and microscopic plants and animals" (NPS 2006b, sec. 4.4.1). The Service will achieve this by

- preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur;
- restoring native plant and animal populations in parks when they have been extirpated by past human-caused actions; and
- minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them (NPS 2006b).

The NPS *Management Policies 2006* further state (section 8.2.2.1) that "Superintendents will develop and implement visitor use management plans and take action, as appropriate, to ensure that recreational uses and activities in the park are consistent with its authorizing legislation or proclamation and do not cause unacceptable impacts on park resources or values" (NPS 2006b, sec. 8.2.2.1).

METHODOLOGY, ASSUMPTIONS, AND IMPACT THRESHOLDS

Curecanti National Recreation Area provides habitat for a variety of mammals, birds, amphibians, and reptiles, which could be affected by actions described in the proposed alternatives. This includes species disturbance and displacement as a result of vehicle noise, habitat destruction, and species injury or mortality. Much of the existing research has focused on habitat fragmentation, the effects of erosion, and vegetation trampling by visitors. In addition to habitat fragmentation and disruption, the primary issue of concern is direct species mortality from vehicle collisions.

Impacts to wildlife and wildlife habitat were assessed by determining the current species status and condition of habitat in the recreation area, and evaluating the extent to which motorized vehicle access would cause potential impacts. This included an assessment of the potential beneficial effects of closing certain routes/areas to motorized vehicles, including snowmobiles. The following thresholds for the impacts on wildlife and wildlife habitat were defined.

Negligible: Wildlife would not be affected or the effects would be at or below the level of detection, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population.

Minor: Effects to wildlife would be detectable, although the effects would be localized, and would be small, and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects to wildlife would be readily detectable, long term, and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.

Major: Effects to wildlife would be obvious, would be long term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Duration: Short-term — Recovers in less than 1 year.

Long-term — Takes more than 1 year to recover.

IMPACT OF THE ALTERNATIVES

Alternative A: No Action (Continuation of Current Management)

Under alternative A, motorized vehicle use within the recreation area would be allowed as described in the Superintendent's Compendium (NPS 2009f). Designated routes, areas, and snowmobile access routes would be subject to year-round, seasonal, and/or site-specific closures. A total of approximately 61 miles of routes above the high water line would be open to motorized vehicles, as well as 8,239 acres below the high water line, including 7,280 acres not traditionally used. Motorized vehicle use would have impacts including species disturbance and displacement, habitat destruction and fragmentation, and vehicle-wildlife collisions causing species injury or mortality. For example, amphibians and reptiles have been crushed to death or injured by ORV use on public lands (Bury and Luckenbach 2002). Other risks range from injury during escape responses to the more severe habitat avoidance and nest abandonment. Although studies have not been conducted in this park specifically, several studies indicate that wildlife

generally experience an increase in heart rate and altered metabolism when introduced to human-made noise (Radle 2007). Noise from motorized vehicles can inhibit the senses of animals that depend on hearing and vibration detection to survive (Berry 1980; Bury 1980); for example, bats and certain reptile species.

Much of the existing research has focused on the effects of erosion and of trampled vegetation due to visitors, and the associated impacts on wildlife habitat values (Joslin and Youmans 1999; Monz et al. 2003). ORV-related impacts on amphibian and reptile species were identified in Montana and include indirect impacts on populations via habitat destruction, chemical contamination and sedimentation, and the creation of migration barriers.

Studies on small mammals have reported adverse effects from motorized vehicle use, including population reduction, habitat modification, forage/cover removal, echolocation disturbance, and energy expenditure (Joslin and Youmans 1999). Subnivean (i.e., beneath the snow) wildlife is affected by snow compaction from winter recreational vehicles, which alters snow microclimate, reduces air space, reduces soil suitability for spring seed germination, and increases mortality (Boyle and Samson 1985; Caslick and Caslick 1997; Wisdom et al. 2004).

Further research regarding the adverse effects of human recreational activities among bird species has shown nest desertion and temporary abandonment, and changes in foraging habits (Joslin and Youmans 1999). Similar studies of wintering raptors in Colorado indicate that perching distances and species richness were greater at locations away from trails, denoting that trails affect habitat selection (Fletcher et al. 1999). Bird species in the recreation area that nest on or near the ground near the access routes would most likely be more vulnerable to the effects of motorized vehicles, due to direct exposure of nests and young to visitors and motorized vehicles.

Among ungulate species, such as deer (*Odocoileus* spp.) and elk (*Cervus canadensis*), research has shown that the effects of recreational disturbance include relatively high energy expenditures resulting from increased heart rate and altered behavioral response (Joslin and Youmans 1999). Winter disturbances may cause larger mammals to expend energy beyond caloric intake, which can result in decreased birthrate and increased mortality (Caslick and Caslick 1997). Motorized vehicles have the ability to destroy habitat, resulting in fragmentation. Larger carnivores, such as mountain lion (*Puma concolor*) and bobcat (*Lynx rufus*), require large home ranges, which makes them more vulnerable to habitat fragmentation and disturbance resulting from motorized vehicle use (Joslin and Youmans 1999). Black and others (n.d.) state that avoidance is a learned response in wildlife and is important in the Gunnison Basin, where animals have learned to flee from hunters. These authors also report that bighorn sheep (*Ovis canadensis*) have a tendency to abandon traditional habitat range and alter social patterns in response to human activity, which could greatly affect survivability of the species.

Locally, along open routes and areas, habitat fragmentation would continue to be apparent and species mortality could occur, but overall, populations would remain stable in the recreation area. Species populations would most likely recover from impacts in less than a year, although it could take longer for habitat to recover. As a result, motorized vehicle access in these areas would have localized, short- and long-term, minor adverse impacts on wildlife and wildlife habitat.

Cumulative Impacts

There has been recreational ORV use in the recreation area since its establishment in 1965. Implementation of closures documented in the Superintendent's Compendium (NPS 2009f) and the 2007 OHV Interim Management Plan for Curecanti have provided protection for wildlife in some areas. In addition, resource protection zones in the park unit's 1997 general management plan (NPS 1997a), especially those that limit motorized vehicle access, also help protect wildlife.

Prior to implementing the 2006 fire management plan (NPS 2006g), Curecanti staff followed a policy of full fire suppression. Past suppression of all fires at the recreation area removed a component of the ecosystem that plays an important role in the evolution and establishment of wildlife habitat, as described in the cumulative impacts analysis for vegetation. Currently, fire management is guided by the 2006 plan (NPS 2006g), which calls for the use of wildland fire and prescribed burns, to the extent practicable, to restore this ecological process. As noted in the vegetation cumulative impacts analysis, this has beneficial effects for both wildlife and wildlife habitat. Invasive, non-native vegetation control, per the noxious weed operating plan developed annually by the NPS and Gunnison County, also helps restore and perpetuate native wildlife habitat at Curecanti National Recreation Area. There are possible adverse effects associated with fire management and invasive plant removal on wildlife and wildlife habitat, but the negative impacts are negligible when compared to the long-term benefits of maintaining and restoring natural conditions.

Wildlife management plans, such as the Gunnison sage-grouse Conservation Plan and the Colorado Gunnison's and White-tailed Prairie Dog Conservation Strategy, help protect wildlife and wildlife habitat. These initiatives seek to promote conservation of these wildlife species and their habitat, and recommend strategies that would benefit existing habitat in or near the park, such as vegetation treatments, livestock management, big game management, initiation of fire regimes, native grass reseeding, and/or control of non-native vegetation.

Management tools related to big game animals, such as hunting, wildlife feeding programs, and species reintroductions, help maintain wildlife populations and the viability of their associated habitats over the long term. Reintroductions of native wildlife also contribute to the species richness of an area.

ORV use also occurs on adjacent public and private lands with the majority of off-road use occurring on nearby USFS/BLM lands which contain hundreds of miles of vehicle routes open for public use. The use of vehicles, including ATVs, jeeps, or other high-clearance vehicles, off formal roads has the potential to cause similar impacts to wildlife as those described previously. Although the new BLM/USFS travel management plan will close some roads, it will continue to allow ORV use on thousands of miles of routes, and as a result, related impacts are expected to continue in the future.

The BLM Gunnison Resource Area and Uncompahgre Basin RMPs and the 1983 Grand Mesa, Uncompahgre, and Gunnison National Forest Land Management Plan mandate multiple uses of the lands they cover, including recreational opportunities, mineral development, grazing, and designation of wilderness areas and species winter range. While these plans provide measures to manage and protect resources such as wildlife and wildlife habitat, impacts from these uses contribute to disturbance, habitat fragmentation, and species mortality.

Livestock grazing has occurred since before the establishment of the recreation area and continues to occur in numerous locations adjacent to and inside the recreation area. Grazing of sheep, cattle, and horses occurs on NPS, BLM, USFS, and private property. Depending on the intensity of the operation, livestock grazing can result in the spread of invasive species and excessive vegetation removal, which disrupt native wildlife and habitat. In addition to grazing, development, operation, and expansion of the Dickerson Pit granite mine in the park unit has resulted in the disturbance of approximately 12.4 acres. The drilling, blasting, and extracting of material in the operation disrupt native wildlife and wildlife habitat.

Wildlife disturbance has been caused by past development inside and outside the park, including construction and maintenance of recreation area facilities in accordance with the 1980 general management plan, construction and maintenance of Reclamation and Western facilities, and private land development. Development, maintenance, and expansion of such facilities could have adverse impacts on

wildlife, including habitat and species disruption through ground disturbances. Maintenance of the numerous county and CDOT roads and rights-of-way in and around the recreation area also has the potential to disrupt natural resources, including wildlife and wildlife habitat.

Although increased energy developments could occur as a result of the plan to designate energy corridors on USFS/BLM lands, the corridor designated in the Gunnison area follows one of the Western transmission lines across Gunnison Basin, and any projects would likely affect previously disturbed habitat.

Despite some beneficial effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to wildlife and wildlife habitat would be short term and long term, minor to moderate, and adverse. Actions directly related to alternative A would have measurable contributions to impacts on wildlife and wildlife habitat.

Conclusion

Localized, short- and long-term, minor adverse impacts on wildlife could result from species disturbance and displacement, habitat damage and fragmentation, and species mortality. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the short- and long-term minor adverse impacts from continued motorized vehicle use under alternative A, would result in short- and long-term minor to moderate cumulative impacts on wildlife and wildlife habitat. There would be no impairment of wildlife or habitat under alternative A because species populations would most likely recover from impacts in less than a year, although it could take longer for impacted habitat to recover. Locally, along open routes and areas, habitat fragmentation would continue to be apparent and species mortality could occur, but overall, populations would remain stable in the recreation area. Consequently, there would be no change to the natural integrity of wildlife in the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established or other resource management goals.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

Under alternative B, motorized vehicle use within the recreation area would be allowed only in areas designated as open, including routes/areas above and below the high water line of Blue Mesa Reservoir. Routes and areas in the Semi-Primitive/Non-Motorized zone of the 1997 general management plan would be closed. As a result, there would be approximately 14 miles of designated routes open to public motorized vehicles. Approximately 8,239 acres below the high water line at Blue Mesa Reservoir, of which 7,280 are open but not traditionally used because of access limitations created by terrain or reservoir levels, would also be open to public motorized vehicles. Routes that would be closed to the public because of the general management plan prescriptions include power line access roads and spurs to the reservoir found on the south side of Blue Mesa, as well as miscellaneous routes that do not necessarily provide access for other recreational opportunities at the park. Other routes that would be closed include those that tie into BLM/USFS routes that have been recommended for closure in their travel management planning process, or those that are not generally used to access other recreational opportunities at the park.

As described for alternative A, motorized vehicle use, especially when it occurs off designated routes (either inadvertently or intentionally), causes wildlife and wildlife habitat disturbance. This disturbance, along with the habitat fragmentation, can lead to altered species range and social patterns, as well as species mortality. However, under alternative B, reduced speed limits and requirements for snowmobiles to use only direct routes between designated access points and the frozen surface of Blue Mesa Reservoir

would reduce the potential for wildlife-vehicle collisions, as well as disturbance of those species that use the habitat at the shoreline edge. In addition, the NPS would establish vehicle track width requirements that would reduce the potential for motorized vehicles to have impacts on wildlife habitat along existing routes that remain open.

Closing routes that provide access to the south shore of Blue Mesa Reservoir could cause an increase in vehicle use of the north shore and any associated access routes. However, the south shore is only accessible for a short period of time in the early spring before reservoir levels rise, so an increase in use of the north shore would be temporary and would occur outside the high visitor use season (June, July, and August). As a result, there could be a temporary increase in human activity in this area, which could affect wildlife.

The other routes closed under alternative B either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in their planning effort. These routes are not heavily used, and their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

Consequently, under alternative B, localized impacts to wildlife within open motorized vehicle access areas and along open routes would be short term and long term, negligible to minor, and adverse (the effects would potentially be detectable, but would have no or little consequence to wildlife populations). Impacts would be short term in areas away from vehicle routes. Impacts could be long term at localized areas along routes due to continued disturbance along those routes. These impacts would not threaten wildlife population viability within the park.

However, these impacts would occur in fewer areas, as approximately 47 miles of motorized vehicle access routes would be closed as compared to alternative A (access below the high water line at Blue Mesa Reservoir would remain the same). According to Trombulak and Frissell (2001) and Walder (n.d.), the most effective ways to avoid habitat disturbance include road removal and the avoidance of new road construction. There would be long-term beneficial impacts to wildlife and habitat along the closed routes as a result of removing a source of habitat and species disturbance, allowing these areas to recover, or rehabilitating them if funding is available. Recovery of these areas would eventually reduce habitat fragmentation, especially where a number of routes would be closed in the same area (e.g., south of Blue Mesa Reservoir). Beneficial effects would also occur by educating visitors about vehicle-wildlife collisions, speed limits, and restricted areas within the park.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under both alternatives A and B. The cumulative impacts from alternative B would be similar to those from alternative A because the beneficial long-term impacts on wildlife and wildlife habitat of alternative B would only slightly offset some of the adverse cumulative impacts. Therefore, overall cumulative effects would continue to be short term and long term, minor to moderate, and adverse.

Conclusion

Localized, short- and long-term, negligible to minor adverse impacts on wildlife and habitat could occur in areas open to motorized vehicles, but the impacts would occur in fewer areas, as approximately 47 miles of motorized vehicle access routes would be closed as compared to alternative A (access below the high water line at Blue Mesa Reservoir would remain the same). In addition, there would be long-term beneficial impacts to wildlife and habitat along the closed routes, which would be allowed to recover or would be rehabilitated if funding is available. Establishing and enforcing rules regarding motorized vehicle use and educating visitors would contribute to these beneficial impacts. Past, present, and

reasonably foreseeable future activities both inside and outside the recreation area, when combined with the short- and long-term negligible to minor adverse impacts from continued motorized vehicle use under alternative B, would result in short- and long-term, minor to moderate, adverse cumulative impacts on wildlife. There would be no impairment of wildlife or habitat under alternative B because species populations would most likely recover from impacts in less than a year, although it could take longer for impacted habitat to recover. Locally, along open routes and areas, habitat fragmentation would continue to be apparent and species mortality could occur, but overall, populations would remain stable in the recreation area. Consequently, there would be no change to the natural integrity of wildlife in the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established or other resource management goals.

Alternative C (Preferred Alternative): Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including cultural sites. Pedestrian access would be permitted in these areas, outside of resource closures.

As described in alternatives A and B, motorized vehicle use causes wildlife and wildlife habitat disturbance, especially when it occurs off designated routes (either inadvertently or intentionally). Along with habitat fragmentation, disturbance can lead to altered species range and social patterns, as well as species mortality. However, under alternative C, reduced speed limits for all motorized vehicles (except for snowmobiles) to 15 mph would reduce the potential for wildlife-vehicle collisions, as well as disturbance of those species that use the habitat at the seashore edge. Likewise, the requirement for snowmobiles to use only direct routes between designated access points and the frozen surface of Blue Mesa Reservoir would also reduce the potential for wildlife-vehicle collisions and disturbance of those species that use the habitat at the shoreline edge. In addition, the NPS would establish vehicle track width requirements that would reduce the potential for motorized vehicles to have impacts on wildlife habitat along existing routes that remain open.

Closing areas below the high water line of Blue Mesa Reservoir that are not traditionally used would not cause any changes in visitation patterns that would affect wildlife and wildlife habitat. The routes closed under alternative C either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in their planning effort. These routes are not heavily used, and as a result, their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

Accordingly, under alternative C, localized impacts to wildlife and habitat within open motorized vehicle access areas and along open routes would be short term and long term, negligible to minor, and adverse. Impacts would most likely be short term in areas removed from vehicle routes. Impacts could be long term at localized areas along routes due to continued disturbance along those routes. These impacts would not threaten wildlife population viability within the park.

However, these impacts would occur in fewer areas, as 32 miles of motorized vehicle access routes would be closed as compared to alternative A. These closed areas would be allowed to recover or would be

rehabilitated if funding is available, which would reduce habitat fragmentation. In addition, although the areas are not traditionally used, closing 7,280 acres below the high water line at Blue Mesa Reservoir would reduce the potential for impacts to wildlife and habitat from motorized vehicle access in these areas. These closures would have long-term beneficial impacts to wildlife and habitat along the closed routes and below the high water line. Establishing and enforcing rules regarding motorized vehicle use in the recreation area would help reduce species mortality and disturbance, which would contribute to beneficial impacts. Beneficial effects would also occur by educating visitors about vehicle-wildlife collisions, speed limits, and restricted areas within the park.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under alternatives A, B, and C. The cumulative impacts from alternative C would be similar to those from alternative A because the beneficial long-term impacts on wildlife and wildlife habitat of alternative C would only slightly offset some of the adverse cumulative impacts. Therefore, overall cumulative effects would continue to be short term and long term, negligible to minor, and adverse.

Conclusion

Localized, short- and long-term, minor to moderate adverse impacts on wildlife and wildlife habitat could occur in areas open to motorized vehicles. The impacts would occur in fewer areas, as 32 miles of motorized vehicle access routes would be closed as compared to alternative A. In addition, 7,280 acres below the high water line at Blue Mesa Reservoir not traditionally used because of difficult access would be officially closed to motorized vehicles. Consequently, there would be long-term beneficial impacts to wildlife and habitat along the closed routes, which would be allowed to recover or would be rehabilitated if funding is available. This would contribute to beneficial impacts by reducing habitat fragmentation. Establishing and enforcing rules regarding motorized vehicle use and educating visitors would also contribute to these beneficial impacts. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the short- and long-term minor to moderate adverse impacts from continued motorized vehicle use under alternative C, would result in short- and long-term, minor to moderate, adverse cumulative impacts on wildlife and wildlife habitat. There would be no impairment of wildlife or habitat under alternative C because species populations would most likely recover from impacts in less than a year, although it could take longer for impacted habitat to recover. Locally, along open routes and areas, habitat fragmentation would continue to be apparent and species mortality could occur, but overall, populations would remain stable in the recreation area. Consequently, there would be no change to the natural integrity of wildlife in the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established or other resource management goals.

SPECIES OF SPECIAL CONCERN

GUIDING REGULATIONS AND POLICIES

According to the NPS *Management Policies 2006* (NPS 2006b), the NPS will inventory, monitor, and manage state-listed and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. Director's Order-77: Natural Resource Management is currently being developed, until which time the former NPS-77 (NPS 2004c) still applies. NPS-77 addresses the management of state species of concern that need to be considered in the NEPA process.

SPECIES TO BE EVALUATED

The species retained for a full evaluation of the effects of the motorized vehicle access plan are listed in the "Affected Environment" chapter. None of the species retained for evaluation is listed under the *Endangered Species Act of 1973*. As a result, none of the alternatives would have any effect on federally listed species or designated critical habitat. Therefore, the analysis of special-status species focuses on state-listed species of special concern. Impacts on some of these species would be minimal, and therefore, they have been dismissed from further evaluation (see "Issues Considered by not Carried Forward for Detailed Analysis" in the "Purpose of and Need for Action" chapter). Impacts to the remainder of the state species of special concern are evaluated in this section.

METHODOLOGY, ASSUMPTIONS, AND IMPACT THRESHOLDS

To assess impacts on listed species, the following process was used:

- Identification of which species are in areas likely to be affected by management actions described in the alternatives
- Analysis of habitat loss or alteration caused by the alternatives
- Analysis of disturbance potential of the actions and the species' potential to be affected by the actions

The following thresholds were used to determine impacts to species of special concern.

Negligible: Impacts would result in a change to a population or individuals of a species of special concern, but the change would be well within the range of natural fluctuations.

Minor: An action that would affect a few individuals of a species of special concern or have very localized impacts upon their habitat. The change would have barely perceptible consequences to the species or habitat function. Sufficient habitat would remain functional to maintain species viability. Impacts would be outside critical reproduction periods. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: An action that would cause measurable effects on: (1) a relatively small percentage of the species population; (2) the existing dynamics between multiple species (e.g., predator-prey, herbivore-forage, vegetation structure-wildlife breeding habitat); or (3) a relatively large habitat area or important habitat attributes. A population or habitat might deviate from normal levels under existing conditions, but would remain indefinitely viable within the park unit. Response to disturbance by some individuals could be expected, with some negative impacts to feeding, reproduction, or other factors impacting population levels. Mitigation measures, if needed to offset adverse effects, could be extensive, but would likely be successful.

Major: An action that would have drastic consequences for a species population, dynamics between multiple species, or almost all available unique habitat. A population or its habitat would be altered from normal levels under existing conditions, and the species would be at risk of extirpation within the park unit. Frequent responses to disturbance by some individuals would be expected, with negative impacts to feeding, reproduction, or other factors resulting in a decrease in population levels. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

IMPACT OF THE ALTERNATIVES

Alternative A: No Action (Continuation of Current Management)

Gunnison sage-grouse. Motorized vehicle (including snowmobile) access in areas that support Gunnison sage-grouse (e.g., sagebrush shrublands, wet meadows) would cause impacts similar to those described for wildlife and wildlife habitat. These localized effects would occur along open routes and areas and would include disturbance and displacement of individual Gunnison sage-grouse; potential vehicle collisions that could cause injury or mortality; and habitat modification, destruction, and fragmentation. Although localized disturbance, displacement, or collisions between Gunnison sage-grouse and vehicles would likely result in injury and/or mortality that could affect population numbers in the park, this would only affect a small percentage of the species across its range. In addition, because these impacts would only occur along open motorized vehicle access routes, sufficient habitat would remain functional in other parts of the recreation area to maintain species viability. As a result, the species would not be at risk of extirpation within the park unit.

While there is the potential for such impacts to occur during breeding season for Gunnison sage-grouse (mid-March to early June), the only known breeding site (lek) is a historically used area near the shoreline at the Stevens Creek campground. The lek itself is not open to motorized vehicles, and while adjacent areas below the high water line are considered open, they are not traditionally used due to restrictions created by terrain or reservoir levels. In addition, the NPS has the authority under existing regulations to close such an area to mitigate potential impacts to Gunnison sage-grouse. As a result, it is not expected that impacts such as nest abandonment would occur as a result of motorized vehicle access.

Given the nature of the impacts to the Gunnison sage-grouse under alternative A, there would be long-term, minor to moderate, localized adverse impacts to this species of special concern.

Adobe thistle. Adobe thistle is known to occur in the vicinity of Morrow Point Reservoir, including a localized population that occurs in a two-track currently open to motorized vehicles. Although recreation area staff members actively inventory and monitor known populations of this plant, as described in the "Vegetation" analysis in this chapter, motorized vehicle use causes damage to vegetation; results in erosion, which can cause further loss of vegetation; impacts soil productivity, which can affect natural recovery; and creates the potential for the introduction or spread of non-native plants, which can outcompete native vegetation.

As a result, maintaining access in areas that support adobe thistle could cause localized impacts to habitat for this plant along open routes. There would also be measurable impacts on the known population in the two-track, such as loss of individual plants. In addition, motorized vehicle access during May through early July could affect flowering plants located on the route. However, sufficient habitat would remain to maintain viable populations of adobe thistle within the park unit. Therefore, impacts to the adobe thistle under alternative A would be long term, minor to moderate, localized, and adverse. Snowmobile use below the high water line of Blue Mesa Reservoir would not affect the adobe thistle or its habitat.

Cumulative Impacts

Past, present, and reasonably foreseeable future actions with the potential to affect Gunnison sage-grouse and adobe thistle would be the same as those described for wildlife and wildlife habitat, as well as vegetation. In addition to these actions, inventory and monitoring of sensitive plants at the recreation has the potential to contribute to beneficial effects on sensitive species. Designation of an ACEC for sensitive plants in the BLM Gunnison Resource Area RMP would also contribute to such benefits. Despite these and other beneficial past, present, and reasonably foreseeable future actions, cumulative impacts to species of special concern are short and long term, moderate, and adverse (effects occur in a relatively large habitat area; responses to disturbance by some individuals would occur; and although impacts could occur that would affect population levels, these species would remain viable). Actions directly related to alternative A would have noticeable but localized contributions to impacts on the species of concern.

Conclusion

Long-term, minor to moderate adverse effects on species of special concern could occur as a result of localized impacts including disturbance, displacement, or injury/mortality of Gunnison sage-grouse; damage to/loss of adobe thistle plants; and impacts to habitat. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the long-term, minor to moderate adverse impacts from continued motorized vehicle use under alternative A, would result in long-term, moderate adverse cumulative impacts on species of special concern. There would be no impairment of species of special concern under alternative A because impacts, including cumulative effects, would affect a relatively small percentage of the species population. Localized impacts to Gunnison sage-grouse and adobe thistle would occur along open routes and areas and could result in disturbance, injury, or mortality from direct vehicle impact, or habitat modification. However, populations of species of special concern would remain viable in the recreation area. Consequently, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established or other resource management goals.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

As described for alternative A, motorized vehicle access in areas that support Gunnison sage-grouse or adobe thistle would have localized impacts along open routes and areas, including disturbance and displacement of individual Gunnison sage-grouse; potential vehicle collisions that could cause injury or mortality; habitat modification, destruction, and fragmentation; damage to plants; erosion, which can cause further loss of vegetation; effects on soil productivity that could affect natural recovery; and the potential for the introduction or spread of non-native plants, which can outcompete native vegetation.

Closing routes that provide access to the south shore of Blue Mesa Reservoir could cause an increase in vehicle use of the north shore and any associated access routes. However, the south shore is only accessible for a short period of time in the early spring before reservoir levels rise, so an increase in use of the north shore would be temporary and would occur outside the high visitor use season (June, July, and August). As a result, there could be a temporary increase in impacts to Gunnison sage-grouse in this area as compared to alternative A.

The other routes closed under alternative B either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in their planning effort. These routes are not heavily used, and their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

Given the local nature of these impacts, which could occur during reproductive periods, these species would not be at risk of extirpation within the park unit (see alternative A for more detail). In addition, under alternative B, reduced speed limits and requirements for snowmobiles to use only direct routes between designated access points and the frozen surface of Blue Mesa Reservoir would reduce the potential for vehicle collisions, as well as disturbance for Gunnison sage-grouse that use the habitat at the shoreline edge. In addition, the NPS would establish vehicle track width requirements that would reduce the potential for motorized vehicles to have impacts on habitat along existing routes that remain open. As a result, impacts to Gunnison sage-grouse and adobe thistle would be long term, minor, localized, and adverse along open routes and areas.

However, these impacts would occur in fewer areas as compared to alternative A, as approximately 47 miles of motorized vehicle access routes would be closed (access below the high water line at Blue Mesa Reservoir would remain the same). Routes would be closed in Gunnison sage-grouse habitat, including the two-track where a known population of adobe thistle currently occurs. Removing the potential for impacts to Gunnison sage-grouse and adobe thistle would have long-term beneficial effects for these species along closed routes. Beneficial effects would also occur by allowing closed routes to recover and actively rehabilitating them if funding is available.

Cumulative Impacts

Past, present, and reasonably foreseeable future actions with the potential to affect Gunnison sage-grouse and adobe thistle would be the same as those described for alternative A. The cumulative impacts from alternative B would be similar to, but less than, those from alternative A because the beneficial long-term impacts on species of special concern from alternative B would only slightly offset some of the adverse cumulative impacts. Therefore, overall cumulative effects would continue to be short and long term, moderate, and adverse.

Conclusion

Localized, long-term, minor to moderate adverse effects on species of special concern could occur along routes designated as open. There would also be long-term beneficial effects to Gunnison sage-grouse and adobe thistle plants as a result of closing approximately 47 miles of motorized vehicle access routes. Recovery or rehabilitation of closed routes, as well as establishing and enforcing vehicle width requirements, would contribute to these beneficial impacts. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the impacts from under alternative B, would result in long-term, moderate, adverse cumulative impacts on species of special concern. There would be no impairment of species of special concern under alternative B because impacts, including cumulative effects, would affect a relatively small percentage of the species population. Localized impacts to Gunnison sage-grouse and adobe thistle would occur along open routes and areas and could result in disturbance, injury, or mortality from direct vehicle impact, or habitat modification. However, populations of species of special concern would remain viable in the recreation area. Consequently, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established or other resource management goals.

Alternative C (Preferred Alternative): Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general

management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including cultural sites. Pedestrian access would be permitted in these areas, outside of resource closures.

As described for alternative A, motorized vehicle access in areas that support Gunnison sage-grouse or adobe thistle would have localized impacts along open routes and areas, including disturbance and displacement of individual Gunnison sage-grouse; potential vehicle collisions that could cause injury or mortality; habitat modification, destruction, and fragmentation; damage to plants; erosion, which can cause further loss of vegetation; effects on soil productivity that could affect natural recovery; and the potential for the introduction or spread of non-native plants, which can outcompete native vegetation.

Closing areas below the high water line of Blue Mesa Reservoir that are not traditionally used would not cause any changes in visitation patterns that would affect soils. The routes closed under alternative B either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in their planning effort. These routes are not heavily used, and as a result, their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

Given the local nature of these impacts, which could occur during reproductive periods, these species would not be at risk of extirpation within the park unit (see alternative A for more detail). In addition, under alternative C, reduced speed limits for all motorized vehicles (except for snowmobiles) to 15 mph would reduce the potential for wildlife-vehicle collisions, as well as disturbance for Gunnison sage-grouse that use the habitat at the shoreline edge. Likewise, the requirement for snowmobiles to use only direct routes between designated access points and the frozen surface of Blue Mesa Reservoir would also reduce the potential for wildlife-vehicle collisions and disturbance for Gunnison sage-grouse that use the habitat at the shoreline edge. In addition, the NPS would establish vehicle track width requirements that would reduce the potential for motorized vehicles to have impacts on habitat along existing routes that remain open. As a result, impacts to Gunnison sage-grouse and adobe thistle would be long term, minor, localized, and adverse along open routes and areas.

However, these impacts would occur in fewer areas as compared to alternative A, as approximately 32 miles of motorized vehicle access routes would be closed. Approximately 7,280 acres of areas not traditionally used below the high water line would also be closed. Routes would be closed in Gunnison sage-grouse habitat, including the two-track where a known population of adobe thistle currently occurs. Areas below the high water line that occur near the historically used Gunnison sage-grouse lek would also be closed. Removing the potential for impacts to Gunnison sage-grouse and adobe thistle would have long-term beneficial effects for these species along closed routes and areas. Beneficial effects would also occur by allowing closed routes to recover or actively rehabilitating them if funding is available.

Cumulative Impacts

Past, present, and reasonably foreseeable future actions with the potential to affect Gunnison sage-grouse and adobe thistle would be the same as those described for alternative A. The cumulative impacts from alternative C would be similar to those from alternative A because the beneficial long-term impacts on species of special concern from alternative C would only slightly offset some of the adverse cumulative impacts. Therefore, overall cumulative effects would continue to be short term and long term, moderate, and adverse.

Conclusion

Although long-term, minor to moderate adverse effects on species of special concern could occur along routes designated as open, there would also be long-term beneficial effects to Gunnison sage-grouse and adobe thistle plants as a result of closing 32 miles of motorized vehicle access routes, as well as 7,280 acres below the high water line of Blue Mesa Reservoir. Recovery or rehabilitation of closed routes, as well as establishing and enforcing vehicle width requirements, would contribute to these beneficial impacts. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the impacts under alternative C, would result in long-term, moderate adverse cumulative impacts on species of special concern. There would be no impairment of species of special concern under alternative C because impacts, including cumulative effects, would affect a relatively small percentage of the species population. Localized impacts to Gunnison sage-grouse and adobe thistle would occur along open routes and areas and could result in disturbance, injury, or mortality from direct vehicle impact, or habitat modification. However, populations of species of special concern would remain viable in the recreation area. Consequently, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established or other resource management goals.

SOILS

GUIDING REGULATIONS AND POLICIES

NPS *Management Policies 2006* states that the NPS will prevent, "to the extent possible, the unnatural erosion, physical removal, or contamination of the soil or its contamination of other resources" (NPS 2006b, sec. 4.8.2.4). The NPS *Management Policies 2006* further states that management action will be taken to prevent or minimize potentially irreversible adverse impacts on soils.

METHODOLOGY, ASSUMPTIONS, AND IMPACT THRESHOLDS

Impacts to soils were assessed by determining the types and current condition of the soils in the recreation area, and evaluating the extent to which motorized vehicle access would cause potential impacts. This included an assessment of the potential beneficial effects of closing certain routes/areas to motorized vehicle access. Because 26 of the 28 total soil series identified in the recreation area exhibit moderate to severe erosion hazard on roads and trails, erosion is the primary issue analyzed, but other effects are also addressed. It is assumed that impacts to soils from snowmobile use would only occur as a result of other motorized vehicle access because snowmobile use under any alternative is limited to the frozen surface of Blue Mesa Reservoir or the associated access points would be on the snow surface and accessed by existing roads for the single designated route. The thresholds for the intensity of an impact are defined as follows:

Negligible: The impact is at the lowest levels of detection and causes very little or no physical disturbance /removal, compaction, or unnatural erosion, when compared with current conditions.

Minor: The impact is slight but detectable in some areas, with few perceptible effects of physical disturbance/removal, compaction, or unnatural erosion of soils.

Moderate: The impact is readily apparent in some areas and has measurable effects of physical disturbance/removal, compaction, or unnatural erosion of soils.

Major: The impact is readily apparent in several areas and has severe effects of physical disturbance/removal, compaction, or unnatural erosion of soils.

Duration: Short-term — Recovers in less than 3 years.

Long-term — Takes more than 3 years to recover.

IMPACT OF THE ALTERNATIVES

Alternative A: No Action (Continuation of Current Management)

Under alternative A, motorized vehicle use within the recreation area would be allowed as described in the Superintendent's Compendium (NPS 2009f). Designated routes and areas would be subject to year-round, seasonal, and/or site specific closures. A total of 61 miles of routes above the high water line would be open to motorized vehicles, as well as 8,239 acres below the high water line, including 7,280 acres not traditionally used. Motorized vehicle use would continue and may increase with increased visitation, and would result in impacts including soil compaction and erosion, loss of fertility and production, and potential loss of biological soil crusts, especially if vehicles travel off established routes/areas.

Iverson (1980) showed that soil compaction can lead to soil erosion, largely because of decreased infiltration rates of rainwater, which increases surface water flow that causes erosion. Other studies have shown similar impacts, documenting soil compaction with as few as ten passes of motorized vehicles (Webb 1982), and erosion of compacted soils, including the formation of gullies (Tuttle and Griggs 1987). Should vehicles travel off established routes (inadvertently or intentionally), they can destroy vegetation, which reduces soil cover and thus contributes to and accelerates surface erosion (USFS 2000). This is especially true in areas with steep slopes, along water flow paths, and exposed to wind. Considering that the majority of soils at Curecanti exhibit moderate to severe erosion hazard, such impacts would be apparent and measurable, although very localized.

Soil compaction also leads to reductions in fertility and productivity. Studies have shown statistically significant reduction in soil nitrogenase activity as a result of motorized vehicle use off established roads (Belnap 2002). Nitrogenase activity, which contributes to soil fertility and productivity, results from an enzyme that catalyzes nitrogen fixation. Biological soil crusts are especially susceptible to damage by motorized vehicles. They are often primary contributors to soil fertility, stability, and primary productivity due to the nitrogenase activity of soil lichens, cyanobacteria, and moss (Belnap 1996, 2002).

In addition to reduction in primary productivity though decreasing nitrogenase activity, soil compaction can impede the establishment of plants by inhibiting root expansion. In one study, partial recovery of vegetation—which was primarily exotic species—and associated soil cover took a minimum of 1 year (Webb 1982). Another study (Webb and Wilshire 1980) found that half a century after a ghost town had been abandoned in Nevada, soils had still not recovered. Recovery of fragile biological soil crusts can also take decades, or even centuries, depending on the soil type (Belnap 1993, 2003; Webb and Wilshire 1980).

As mentioned previously, impacts of motorized vehicle use below the high water line at Blue Mesa Reservoir include soil compaction and rutting, primarily from vehicles that get stuck in saturated soils. A study by Adams and others (1982) showed that soil compaction as a result of off-road motorized vehicle use is more pronounced on wet soils than dry soils. Although these impacts, including associated effects of compaction on soil fertility and productivity, are readily apparent, the soils below the high water line generally recover within a year because of wave action and seasonal fluctuations in reservoir levels that

replenish the affected areas. Therefore, motorized vehicle use below the high water line at Blue Mesa Reservoir would have short-term, moderate adverse impacts on soils.

Along routes in areas above the high water line, soil compaction and erosion would be apparent, impacts on fertility could be measurable, and recovery could take more than 3 years. As a result, motorized vehicle access in these areas would have long-term, moderate, localized (along open routes) adverse impacts on soils.

Cumulative Impacts

There has been recreational ORV use in the recreation area since its establishment in 1965. Implementation of closures documented in the Superintendent's Compendium (NPS 2009f) and the 2007 OHV Interim Management Plan for Curecanti have provided protection for soils in some areas. In addition, resource protection zones in the park unit's 1997 general management plan (NPS 1997a), especially those that limit motorized vehicle access, also help protect soils, as does implementation of the 2004 Disturbed Lands Inventory and Restoration Recommendations.

ORV use also occurs on adjacent public and private lands, with the majority of ORV use occurring on nearby USFS/BLM lands, which contain hundreds of miles of vehicle routes open for public use. While most of the vehicular use inside the recreation area is by typical street-legal cars and trucks, much of the vehicular use on adjacent lands involves the use of ORVs such as ATVs, jeeps, or other high-clearance vehicles. The use of vehicles off formal roads has the potential to cause adverse impacts to soils similar to those described previously. Although the new BLM/USFS travel management plan will close some roads, it will continue to allow ORV use on thousands of miles of routes, and as a result, related impacts are expected to continue in the future.

The BLM Gunnison Resource Area and Uncompahgre Basin Resource Management Plans, as well as the 1983 Grand Mesa, Uncompahgre, and Gunnison National Forest Land Management Plan mandate multiple use of the lands they cover, including recreational opportunities, mineral development, and grazing. While these plans provide measures to manage and protect resources such as soils, impacts from these uses contribute to soil loss, compaction, and erosion.

Livestock grazing has occurred since before the establishment of the recreation area and continues to occur in numerous locations adjacent to and inside the recreation area. Grazing of sheep, cattle, and horses occurs on NPS, BLM, USFS, and private property. Depending on the intensity of the operation, livestock grazing has the potential to cause soil erosion and soil compaction, which can lead to a loss of soil fertility and productivity. Grazing also has the potential to result in loss of biological soil crusts. In addition to grazing, development, operation, and expansion of the Dickerson Pit granite mine in the park unit has resulted in loss of soils and contributed to soil compaction.

Soil loss has been caused by development inside and outside the park, including construction and maintenance of recreation area facilities in accordance with the 1980 general management plan; construction and maintenance of Reclamation and Western facilities; and private land development. Future development, maintenance, and expansion of such facilities could have potential adverse impacts on soils, including soil loss, compaction, and erosion. Maintenance of the numerous county and CDOT roads and rights-of-way in and around the recreation area also has the potential to cause soil compaction and erosion.

Although increased energy developments could occur as a result of the plan to designate energy corridors on USFS/BLM lands, the corridor designated in the Gunnison area follows one of the Western transmission lines across Gunnison Basin, and any projects would likely affect previously disturbed soils.

Despite some beneficial effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to soils would be short term and long term, moderate, and adverse (impacts would be readily apparent in some areas and measurable). Actions directly related to alternative A would have measurable contributions to localized impacts on soils.

Conclusion

Short- and long-term, moderate, adverse, generally localized impacts on soils could result from soil compaction and erosion; loss of fertility and productivity; and loss of biological soil crusts. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the short- and long-term, moderate, adverse impacts from continued motorized vehicle use under alternative A, would result in short- and long-term, moderate, adverse cumulative impacts on soil. Motorized vehicle use under alternative A would result in soil compaction, erosion, and potential loss of biological soil crusts, especially if vehicles travel off established routes/areas. Although there would be readily apparent measurable disturbance to soils, there would be no impairment under alternative A because impacts would be localized around existing routes and would not be severe in nature. Consequently, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established or other resource management goals.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

Under alternative B, motorized vehicle use within the recreation area would be allowed only in areas designated as open, including routes/areas above and below the high water line of Blue Mesa Reservoir. Routes and areas in Semi-Primitive/Non-Motorized zone of the 1997 general management plan would be closed. As a result, there would be approximately 14 miles of designated routes open to public motorized vehicles. Approximately 8,239 acres below the high water line at Blue Mesa Reservoir, of which 7,280 are open but not traditionally used because of access limitations created by terrain or reservoir levels, would also be open to public motorized vehicles.

Routes that would be closed to the public because of the general management plan prescriptions include power line access roads and spurs to the reservoir found on the south side of Blue Mesa, as well as miscellaneous routes that do not necessarily provide access for other recreational opportunities at the park. Other routes that would be closed include those that tie into BLM/USFS routes that have been recommended for closure in their travel management planning process, or those that are not generally used to access other recreational opportunities at the park.

As described for alternative A, motorized vehicle use, especially when it occurs off designated routes (either inadvertently or intentionally), causes soil compaction. This compaction, along with the loss of biological soil crusts, can lead to decreased soil fertility and production, and causes increased erosion. Closing routes that provide access to the south shore of Blue Mesa Reservoir could cause an increase in vehicle use of the north shore and any associated access routes. However, the south shore is only accessible for a short period in the early spring before reservoir levels rise, so an increase in use of the north shore would be temporary and would occur outside the high visitor use season (June, July, and August). As a result, there would be limited potential for an increase in soil impacts in this area as compared to alternative A.

The other routes closed under alternative B either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in

their planning effort. These routes are not heavily used, and their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

Consequently, under alternative B, impacts to soils within open motorized vehicle access areas and along open routes would continue to be short term and long term, moderate, and adverse (as described for alternative A, they would be readily apparent and measurable). Impacts would be short term below the high water line of Blue Mesa Reservoir because of the wave action and seasonal fluctuations in reservoir levels. Impacts above the high water line would be localized but long term because of the lengthy recovery period for soils, including biological soil crusts, found in arid environments.

However, these impacts would occur in fewer areas, as approximately 47 miles of motorized vehicle access routes would be closed as compared to alternative A (access below the high water line at Blue Mesa Reservoir would remain the same). In addition, there would be long-term beneficial impacts to soils along the closed routes as a result of removing a source of soil compaction and erosion, allowing these areas to recover, and rehabilitating them if funding is available. Establishing and enforcing vehicle width requirements would reduce the potential for motorized vehicles to have impacts on soils outside existing routes, which would contribute to beneficial impacts. Beneficial effects would also occur by educating visitors about driving below the high water line, how to avoid getting stuck, and how to dig out without causing major soil damage.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under both alternatives A and B. The cumulative impacts from alternative B would be similar to those from alternative A because the beneficial long-term impacts on soil of alternative B from the reduction of open routes would only slightly offset some of the adverse cumulative impacts, and alternative B would also contribute some adverse impacts. Therefore, overall cumulative effects would continue to be short term and long term, moderate, and adverse.

Conclusion

Impacts to soils would be short term and long term, moderate, and generally localized in areas open to motorized vehicle access. The impacts would occur in fewer areas, as approximately 47 miles of motorized vehicle access routes would be closed as compared to alternative A (access below the high water line at Blue Mesa Reservoir would remain the same). In addition, there would be long-term beneficial impacts to soils along the closed routes, which would be allowed to recover or would be rehabilitated if funding is available. Establishing and enforcing vehicle width requirements and educating visitors about driving below the high water line would contribute to these beneficial impacts. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the short- and long-term, moderate, adverse impacts from continued motorized vehicle use under alternative B, would result in short- and long-term, moderate, adverse cumulative impacts on soil. Motorized vehicle use under alternative B would result in soil compaction, erosion, and potential loss of biological soil crusts, especially if vehicles travel off established routes/areas. Although there would be readily apparent measurable disturbance to soils, there would be no impairment under alternative A because impacts would be localized around existing routes and would not be severe in nature. Consequently, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established or other resource management goals.

Alternative C (Preferred Alternative): Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including cultural sites. Pedestrian access would be permitted in these areas, outside of resource closures.

As described in alternatives A and B, motorized vehicle use causes soil compaction, especially when it occurs off designated routes (either inadvertently or intentionally). Along with the loss of biological soil crusts, compaction can lead to decreased soil fertility and production, and causes increased erosion. Closing areas below the high water line of Blue Mesa Reservoir that are not traditionally used would not cause any changes in visitation patterns that would affect soils. The routes closed under alternative C either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in their planning effort. These routes are not heavily used, and as a result, their closure would minimally increase motorized vehicle access on the routes that remain open within the park unit.

Accordingly, under alternative C, impacts to soils within open motorized vehicle access areas and along open routes would continue to be short term and long term, moderate, and adverse. Impacts would be short term below the high water line of Blue Mesa Reservoir because of the wave action and season fluctuations in reservoir levels. Impacts above the high water line would be localized but long term because of the lengthy recovery period for soils, including biological soil crusts, found in arid environments.

However, these impacts would occur in fewer areas, as 32 miles of motorized vehicle access routes would be closed as compared to alternative A. These closed areas would be allowed to recover or would be rehabilitated if funding is available. In addition, although the areas are not traditionally used, closing 7,280 acres below the high water line at Blue Mesa Reservoir would remove the potential for impacts to soils from motorized vehicle access in these areas. These closures would have long-term beneficial impacts to soils along the closed routes and below the high water line. Establishing and enforcing vehicle width requirements would reduce the potential for motorized vehicles to have impacts on soils outside existing routes, which would contribute to beneficial impacts. Beneficial effects would also occur by educating visitors about driving below the high water line, how to avoid getting stuck, and how to dig out without causing major soil damage.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under alternatives A, B, and C. The cumulative impacts from alternative C would be similar to those from alternative A because the beneficial long-term impacts on soil of alternative C would only slightly offset some of the adverse cumulative impacts. Therefore, overall cumulative effects would continue to be short term and long term, moderate, and adverse.

Conclusion

Impacts to soils would be short term and long term, moderate, and generally localized to areas open to motorized vehicle access. The impacts would occur in fewer areas, as 32 miles of motorized vehicle access routes would be closed as compared to alternative A. In addition, 7,280 acres below the high water line at Blue Mesa Reservoir not traditionally used because of difficult access would be officially closed to motorized vehicles. Consequently, there would be long-term beneficial impacts to soils along the closed routes, which would be allowed to recover or would be rehabilitated if funding is available. Establishing and enforcing vehicle width requirements and educating visitors about driving below the high water line would contribute to these beneficial impacts. Past, present, and reasonable foreseeable future activities both inside and outside the recreation area, when combined with the localized short- and long-term, moderate, adverse impacts from continued motorized vehicle use under alternative C, would result in short- and long-term, moderate, adverse cumulative impacts on soils. Motorized vehicle use under alternative C would result in soil compaction, erosion, and potential loss of biological soil crusts, especially if vehicles travel off established routes/areas. Although there would be readily apparent measurable disturbance to soils, there would be no impairment under alternative A because impacts would be localized around existing routes and would not be severe in nature. Consequently, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park unit was established or other resource management goals.

PALEONTOLOGICAL RESOURCES

GUIDING REGULATIONS AND POLICIES

NPS *Management Policies 2006* (sec. 4.8.2.1) states "paleontological resources, including both organic and mineralized remains in body or trace form, will be protected, preserved, and managed for public education, interpretation, and scientific research" (NPS 2006b, sec. 4.8.2.1).

Superintendents will establish programs to inventory paleontological resources and systematically monitor for newly exposed fossils, especially in areas of rapid erosion. Scientifically significant resources will be protected by collection or by on-site protection and stabilization. The NPS will encourage and help the academic community to conduct paleontological field research in accordance with the terms of a scientific research and collecting permit. Fossil localities and associated geologic data will be adequately documented when specimens are collected. Paleontological resources found in an archeological context are also subject to the policies for archeological resources. Paleontological specimens that are to be retained permanently are subject to the policies for museum objects.

The NPS will take appropriate action to prevent damage to and unauthorized collection of fossils. To protect paleontological resources from harm, theft, or destruction, the Service will ensure that information about the nature and specific location of these resources remains confidential, in accordance with the *NPS Omnibus Management Act of 1998*.

METHODOLOGY, ASSUMPTIONS, AND IMPACT THRESHOLDS

Throughout the recreation area, there are 22 paleontological sites/areas currently recorded. The NPS has documented undisturbed and disturbed sites due to human activity within the recreation area (NPS 2008g). Not all of these sites are near proposed or already open roads.

Paleontological resources are non-renewable resources, and adverse effects generally consume, diminish, or destroy the original materials or form, resulting in a loss in the integrity of the resource that can never be recovered.

Impacts to the paleontological resources were assessed by determining the current condition of the sites and evaluating the extent to which motorized vehicle access could potentially cause impacts. Also included was an assessment of the potential beneficial effects of closing certain areas to motorized vehicles. It is assumed that impacts to paleontological resources from snowmobile use would only occur as a result of other motorized vehicle access because snowmobile use under any alternative is limited to the frozen surface of Blue Mesa Reservoir or the associated access points would be on the snow surface and accessed by existing roads for the single designated route.

The thresholds for the intensity of an impact are defined as follows:

Negligible: Effects on paleontological resources would not be measurable. Any effects would be so small that they would not be of any measurable or perceptible consequence and would occur in a relatively small area. There would be no measurable impact to or loss of fossils.

Minor: Effects to paleontological resources would be localized and slightly detectable. Few fossils would be affected by the activities.

Moderate: Effects to paleontological resources would be readily apparent and measurable, and would occur over a relatively large area. A number of fossils may be lost due to a medium probability of impact from ground-disturbing activities.

Major: Effects on paleontological resources would be readily apparent, and would substantially change their character over a large area. Many fossils may be lost due to the high probability of impacts due to ground-disturbing activity.

IMPACT OF THE ALTERNATIVES

Alternative A: No Action (Continuation of Current Management)

Under alternative A, motorized vehicle use would be allowed as described in the Superintendent's Compendium (NPS 2009f). Other designated routes, areas, and snowmobile routes would be subject to seasonal, year-round, and/or site-specific closures. Areas open to motorized vehicle use under alternative A would include approximately 61 miles of routes above the high water line and 8,239 acres below the high water line, including 7,280 acres not traditionally used.

There are no open routes or areas that pass directly over a paleontological site; however, many sites are very close to open areas or routes. There is the potential for motorized vehicles to travel off the designated route/area and run over a site, whether intentionally or not. Vehicle impacts on paleontological sites are similar to impacts on archeological resources (see the impacts under "Cultural Resources" in this chapter). Direct impacts result from the damage or destruction that occurs from the weight and torque of motorized vehicles as they drive over and/or near paleontological sites. The SUWA has cited vegetation loss, soil compaction, and altered hydrology as causes of compaction of surface and subsurface resources, as well as breakage (SUWA 2002). One study (Iverson 1980) showed that soil compaction can lead to soil erosion. Soil compaction decreases infiltration rates of rainwater, increasing surface water flow and causing erosion, which can lead to the exposure and deterioration of fossils.

Any loss of paleontological resources from this damage or exposure would be localized along open routes and areas, but would detectably affect some fossils. As a result there could be localized long-term, minor, adverse impacts to paleontological resources under alternative A.

Cumulative Impacts

There has been recreational ORV use in the recreation area since its establishment in 1965. Implementation of closures documented in the Superintendent's Compendium (NPS 2009f) and the 2007 OHV Interim Management Plan for Curecanti have provided protection for soils in some areas, which in turn protects paleontological resources. In addition, resource protection zones in the park unit's 1997 general management plan (NPS 1997a), especially those that limit motorized vehicle access, also help protect paleontological resources.

ORV use also occurs on adjacent public and private lands, with the majority of ORV use occurring on nearby USFS/BLM lands, which contain hundreds of miles of vehicle routes open for public use. While most of the vehicular use inside the recreation area is by typical street-legal cars and trucks, much of the vehicular use on adjacent lands involves the use of ORVs such as ATVs, jeeps, or other high-clearance vehicles. The use of vehicles off formal roads has the potential to cause adverse impacts to paleontological sites similar to those described previously. Although the new BLM/USFS travel management plan will close some roads, it will continue to allow ORV use on thousands of miles of routes, and as a result, related impacts to paleontological resources are expected to continue in the future. The BLM Gunnison Resource Area and Uncompahgre Basin RMPs and the 1983 Grand Mesa, Uncompahgre, and Gunnison National Forest Land Management Plan mandate multiple uses of the lands they cover, including recreational opportunities, mineral development, and grazing. While these plans provide measures to manage and protect resources such as soils, impacts from these uses contribute to adverse effects on paleontological resources.

Livestock grazing has occurred since before the establishment of the recreation area and continues to occur in numerous locations adjacent to and inside the recreation area. Grazing of sheep, cattle, and horses occurs on NPS, BLM, USFS, and private property. Depending on the intensity of the operation, livestock grazing has the potential to cause soil erosion and soil compaction, which can lead to exposure and loss of fossils.

Development, maintenance, or expansion of facilities inside and outside the recreation area, including recreation area facilities; construction and maintenance of Reclamation and Western facilities; private land development; and maintenance of CDOT roads and rights-of-way all cause disturbances that could damage fossils or lead to exposure of paleontological resources.

Although paleontological resources could be affected by increased energy developments as a result of the plan to designate energy corridors on USFS/BLM lands, the corridor designated in the Gunnison area follows one of the Western transmission lines across Gunnison Basin, and any projects would likely affect previously disturbed areas.

Despite some beneficial effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to paleontological resources would be long term, minor to moderate, and adverse (impacts would be noticeable to readily apparent, and would affect some fossils over a relatively large area). Actions directly related to alternative A could have detectable contributions to impacts on paleontological resources.

Conclusion

Localized long-term, minor, adverse impacts on paleontological resources could result from implementation of alternative A. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the minor impacts from continued motorized vehicle use under alternative A, would result in long-term, minor to moderate, adverse cumulative impacts on paleontological resources. Direct impacts to paleontological resources could occur if motorized vehicles drive over and/or near paleontological sites. Therefore, some fossils could be lost due to a medium probability of impact from ground-disturbing activities associated with motorized vehicle access. Although impacts would be noticeable, there would be no impairment of paleontological resources under alternative A because impacts, including cumulative effects, would only affect a limited number of fossils, if any, and would not substantially change the character of the resource. As a result, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

Alternative B: Designate Motorized Vehicle Access Consistent with the 1997 General Management Plan

Under alternative B, motorized vehicle use within the recreation area would be allowed only in areas designated as open, including routes/areas above and below the high water line of Blue Mesa Reservoir. Areas and routes in the Semi-Primitive/Non-Motorized zone of the 1997 general management plan (NPS 1997a) would be closed. Approximately 14 miles of designated routes would remain open to public motorized vehicles. Approximately 8,239 acres below the high water line at Blue Mesa Reservoir, of which 7,280 are open but not traditionally used because of access limitations created by terrain or reservoir levels, would also be open to public motorized vehicles.

Routes that would be closed to the public because of the general management plan prescriptions include power line access roads and spurs to the reservoir found on the south side of Blue Mesa, as well as miscellaneous routes that do not necessarily provide access for other recreational opportunities at the park. Other routes that would be closed include those that tie into BLM/USFS routes that have been recommended for closure in their travel management planning process, or those that are not generally used to access other recreational opportunities at the park.

Under alternative B, none of the open routes would pass through paleontological sites, but some sites are as close as 25 yards to an open area or route. Potential vehicle impacts on paleontological sites described for alternative A would be the same on such routes under alternative B. Motorized vehicle travel off the designated routes/areas, whether intentional or not, could damage or destroy paleontological sites, or lead to increases in erosion that cause exposure and deterioration of fossils. Any loss of paleontological resources from this damage or exposure would be localized along open routes and areas, but would detectably affect some fossils. Closing routes that provide access to the south shore of Blue Mesa Reservoir could cause an increase in vehicle use of the north shore and any associated access routes. However, none of the paleontological sites occur below the high water line, so any potential increased use of this area would not affect paleontological resources. The other routes closed under alternative B either do not provide access for other recreational opportunities or are being closed because they join routes proposed for closure by the USFS and BLM in their planning effort. Because the routes to be closed are not heavily used, this would minimally increase motorized vehicle access on the routes that remain open within the park unit. As a result, there would be limited potential for an increase in impacts to paleontological resources as compared to alternative A. Therefore, there could be localized long-term, minor, adverse impacts to paleontological resources under alternative B along open routes and areas.

Some of the approximately 47 miles of routes that are closed under this alternative are near paleontological sites. The closing of these previously open routes would limit the areas in which motorized vehicles are authorized to travel. As a result, visitors would be less likely to drive over paleontological resources, causing them to break or be exposed. Therefore, there would be localized long-term beneficial effects on paleontological resources in the vicinity of closed routes.

Cumulative Impacts

The same past, present, and future activities are expected under both alternative A and B. Despite some beneficial effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to paleontological resources would be minor to moderate and adverse (impacts would be noticeable to readily apparent, and would affect some fossils over a relatively large area). Actions directly related to alternative B could have measurable contributions to impacts on paleontological resources.

Conclusion

Although there could be localized, long-term, minor adverse effects on paleontological resources along open routes and areas, there would also be long-term beneficial effects as a result of closing approximately 47 miles of motorized vehicle access routes. Past, present, and reasonably foreseeable future activities both inside and outside the recreation area, when combined with the impacts from continued motorized vehicle use under alternative B, would result in long-term, minor to moderate, adverse cumulative impacts on paleontological resources. Direct impacts to paleontological resources could occur if motorized vehicles drive over and/or near paleontological sites. Therefore, some fossils could be lost due to a medium probability of impact from ground-disturbing activities associated with motorized vehicle access. Although impacts would be noticeable, there would be no impairment of paleontological resources under alternative B because impacts, including cumulative effects, would only affect a limited number of fossils, if any, and would not substantially change the character of the resource. As a result, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

Alternative C (Preferred Alternative): Designate Motorized Vehicle Access and Amend the 1997 General Management Plan

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including paleontological sites. Pedestrian access would be permitted in these areas, outside of resource closures.

Under alternative C, none of the open routes would pass through paleontological sites, and sites are at least 230 yards away. Potential vehicle impacts on paleontological sites described for alternative B would be the same on such routes under alternative C, but would be much less likely given how far sites are from open routes/areas. As a result, there could be localized long-term, negligible, adverse impacts to paleontological resources under alternative C along open routes and areas.

Some of the 32 miles of routes that are closed under this alternative are near paleontological sites. The closing of these previously open routes would limit the areas in which motorized vehicles are authorized

to travel. As a result, visitors would be less likely to drive over paleontological resources, causing them to break or be exposed. Closing 7,280 acres below the high water line that are not traditionally used would not affect paleontological resources because none are located in this area.

Cumulative Impacts

The same past, present, and reasonably foreseeable future activities are expected under alternative A, B, and C. Despite some beneficial effects from other past, present, and reasonably foreseeable future actions, cumulative impacts to paleontological resources would be minor to moderate and adverse (impacts would be noticeable to readily apparent, and would affect some fossils over a relatively large area). Actions directly related to alternative C would not have measurable contributions to impacts on paleontological resources.

Conclusion

Although there could be localized, long-term, negligible adverse effects on paleontological resources along open routes and areas, there would also be long-term beneficial effects as a result of closing 32 miles of motorized vehicle access routes. Closing 7,280 acres below the high water line that are not traditionally used would not affect paleontological resources because none are located in this area. Past, present, and reasonable foreseeable future activities both inside and outside the recreation area, when combined with the localized, negligible, adverse impacts from continued motorized vehicle use under alternative C, would result in minor to moderate adverse cumulative impacts on paleontological resources. Direct impacts to paleontological resources could occur if motorized vehicles drive over and/or near paleontological sites. Therefore, some fossils could be lost due to a medium probability of impact from ground-disturbing activities associated with motorized vehicle access. Although impacts would be noticeable, there would be no impairment of paleontological resources under alternative C because impacts, including cumulative effects, would only affect a limited number of fossils, if any, and would not substantially change the character of the resource. As a result, there would be no change to the natural integrity of the recreation area during the life of this plan, and the NPS would not be precluded from fulfilling either the purposes for which the park was established or other resource management goals.

RECREATION AREA MANAGEMENT AND OPERATIONS / AGENCY COORDINATION

GUIDING REGULATIONS AND POLICIES

Direction for management and operations at Curecanti National Recreation Area is set forth in the recreation area's legal mandates, general management plan (NPS 1997a), Strategic Plan (NPS 2008f), and the current Superintendent's Compendium (NPS 2009f). Legal mandates for the recreation area include the *Colorado River Storage Project Act* and an MOA between Reclamation and the NPS. As documented in the 2008 RPS/EIS, the purpose of the recreation area includes managing "the lands, waters, fish and wildlife, and recreational activities of the recreation area by means that are consistent with Reclamation law … including the purposes of the *Colorado River Storage Project Act* and Uncompahgre Project, and Reclamation agreements affecting the operation of the Aspinall Unit and the Uncompahgre Project" and "to provide for public understanding, use, and enjoyment in such a way as to ensure resource conservation and visitor safety by establishing and maintaining facilities and providing protective and interpretive services" (NPS 2008a). The general management plan (NPS 1997a) established several different zones in the recreation area that were to be managed under specific prescriptions based on desired conditions for visitor experience, access, natural/cultural resources, facilities, and maintenance. The land-based zones established at the recreation area were developed, motorized rural, semi-primitive, and protected resource area, all of which require different levels of management. The Strategic Plan identifies goals pertaining to

facilities maintenance, visitor experience, safety, and resource protection. Many of these goals called for increases in staffing and funding over the life of the Strategic Plan (NPS 2008f).

The Superintendent's Compendium (NPS 2009f) sets forth the closure and public use limits that the recreation area staff are required to enforce, thus determining levels of park operations. The compendium establishes temporary, seasonal, and year-round pedestrian and/or vehicle closures for issues related to public safety, administrative activities, and natural/cultural resource protection. Fluctuating water levels in the reservoir often require staff to repeatedly install or remove temporary closures, as resources become exposed and inundated. The compendium also indicates areas where vehicular access is allowed or prohibited and also references the 2007 OHV Interim Management Plan, which provides details on specific routes available for vehicular use.

ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS

Recreation area management and operations, for the purpose of this analysis, refers to the efforts of NPS staff to maintain and administer resources and provide for an effective visitor experience. This includes an analysis of the projected need for staff time and materials in relation to motorized vehicle access under each of the alternatives, as well as the various funding mechanisms available to implement these alternatives. The analysis also considers trade-offs for staff time or the budgetary needs required to accomplish the proposed alternatives and discusses each alternative in terms of its impacts to the Interpretation, Education and Technology, Resource Stewardship and Science, Facility Management, and Resource and Visitor Protection divisions at the recreation area. Because there are no impacts anticipated for the Management and Administrative divisions, they are not discussed further in this plan/EA.

Recreation area staff members from each of the divisions participated in the planning team and were consulted regarding expected staffing and funding needs under each alternative. The impact analysis is based on the current description of park operations presented in the "Affected Environment" chapter. The required level of effort is discussed in terms of "full-time equivalents," or FTE, which represent the hours worked by staff. One FTE equals 40 hours per week over the course of a year, which could represent one person working 40 hours a week for a year, or two part-time staff members working 20 hours a week each for one year.

Due to the complexity of land management and ownership in and around the recreation area, agency coordination was incorporated into this impact topic. As described in the "Affected Environment" chapter, the NPS, Reclamation, and the USFS all own land within the recreation area and close coordination among these agencies is crucial to ensure that each agency is able to carry out its mission without impeding the operations of the others. Western also has facilities such as roads and transmission lines located on land owned or managed by the NPS. In addition, there are agencies that own and manage lands adjacent to Curecanti National Recreation Area that could be affected by this motorized vehicle access plan.

In August 2008, the NPS released an RPS/EIS (NPS 2008a) that recommended that Congress formally establish Curecanti as a National Recreation Area with a legislated boundary. This action would result in the transfer of approximately 10,040 acres of land currently managed by other federal and state agencies to the recreation area. The potential for this congressional action exists equally under all alternatives. Therefore, potential impacts to agency coordination arising from the addition of these lands and establishment of a legal boundary for the park unit would be considered a cumulative impact for each of the alternatives. The 2008 RPS/EIS concluded that "all agencies should realize a long-term minor to moderate beneficial impact to operations due to appropriate wording in new National Recreation Area legislation; improved wording in a new MOA between Reclamation and NPS; and increased consultation and cooperation among all agencies through the Joint Agency Management Effort." However, the

potential for adverse impacts to recreation area operations would exist if funds commensurate with the increased acreage and management responsibilities were not allocated as part of the lands transfer and boundary establishment.

As described in the "Alternatives" chapter, the addition of adjacent lands would require the NPS to evaluate designation of motorized vehicle access routes on these 10,040 acres. Therefore, any potential impacts from designating or closing routes to vehicular travel (both within the recreation area and on the 10,040 acres to be potentially transferred) have been included in the alternatives analysis below.

The thresholds for evaluating impacts on recreation area management and operations, including agency coordination, were defined as follows.

Negligible: NPS, or other agency operations, would not be affected, or the action would not have a noticeable or appreciable effect on operations.

Minor: Effects would be noticeable, but would be of a magnitude that would not result in an appreciable or measurable change to NPS or other agency operations.

Moderate: Effects would be readily apparent and would result in a substantial change in NPS, or other agency, operations that would be noticeable to staff and the public.

Major: Effects would be readily apparent and would result in a substantial change in NPS, or other agency, operations that would be noticeable to staff and the public, and would be markedly different from existing operations.

Duration: Short-term — Effects would only occur during 1 operating year.

Long-term — Effects would persist beyond 1 operating year.

Study Area

The study area for recreation area management and operations/agency coordination is the land managed as Curecanti National Recreation Area and any routes designated on lands to be potentially transferred to the NPS as recommended by the 2008 RPS/EIS (NPS 2008a).

Alternative A: No Action Alternative (Continuation of Current Management)

Table 11 provides the total staffing and funding needs under alternative A, Continuation of Current Management.

Under alternative A, the management of motorized vehicle access would continue per the requirements of the 2007 OHV Interim Management Plan and the Superintendent's Compendium (NPS 2009f). All routes and areas not closed under these requirements would remain open to motorized vehicle use under this alternative. Approximately 61 miles of routes and 8,239 acres below the high water line (including 7,280 acres not traditionally used) would be open to public motorized vehicles and no closures of existing routes would be required. This includes approximately 4.9 miles of routes designated as open on lands recommended for inclusion in the recreation area by the 2008 RPS/EIS (NPS 2008a). These existing routes would be open to motorized use under BLM/USFS travel management plans, and connect to existing NPS routes. From an NPS management and operations perspective, the addition of adjacent designated routes into the recreation area would increase the mileage of routes that need to be managed.

TABLE 11: COST ESTIMATE FOR IMPLEMENTATION OF ALTERNATIVE A

Division	Assumptions	Annual Costs ($)		
		Staff	Supplemental	Total
Resource and Visitor Protection	0.2 FTE required for enforcement of the Superintendent's Compendium and 2007 OHV Interim Management Plan. Would remain at this level if alternative A was selected.	20,000	0	20,000
Resource Stewardship and Science	0.2 FTE for weed monitoring/management. $3,000 for carsonite posts/signage. An additional 0.25 FTE needed for archeological/paleontological condition assessments.	20,250	3,000	23,250
Facility Management (Maintenance)	Alternative A would require signing of routes and two earth berms removed. Under this alternative the Park Asset Management Plan would include annual routine maintenance cost on signage only. This plan would not include maintenance on the routes other than for an emergency repair (wash-out, etc).	6,005	9,668	15,673
Interpretation, Education, and Technology	0.1 FTE needed for visitor contacts, roving interpretation, web updates, creation of site bulletins, and bulletin board maintenance.	4,700	0	4,700
Total Annual Cost		50,955	12,668	63,623

Law enforcement staff would continue enforcement of the existing motorized vehicle regulations and resource protection measures at current staffing and funding levels. No new facilities or routes would be constructed under alternative A, although the Facility Management Division would remove two earthen berms and continue to provide and maintain signage. No new education or interpretation resources would be needed to implement alternative A and the division would continue to provide personal visitor contact and education, in addition to disseminating materials on bulletin boards and via the recreation area's website. The only additional cost or staffing changes required for implementing alternative A would be an additional 0.25 FTE ($20,250) for the Resource Stewardship and Science Division to perform archeological/paleontological condition assessments on cultural resources discovered as part of this planning effort. The recreation area would reallocate staff within the division to accomplish these tasks, which would result in other divisional responsibilities being temporarily unstaffed or lower in priority. Although this would result in noticeable impacts on individual park staff members, it would not have an appreciable effect on overall recreation area management and operations. Therefore, impacts of managing motorized vehicle access from implementation of current management practices within the recreation area and on lands to be added as part of the 2008 RPS/EIS (NPS 2008a) would be long term, negligible to minor, and adverse.

Cumulative Impacts

Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative A would include past fire suppression efforts, implementation of the 2006 Fire Management Plan (NPS 2006g), implementation of the 2007 OHV Interim Management Plan,

enforcement of snowmobile and watercraft regulations, management of park concessions, and implementation of general management plans. The implementation of these plans and regulations require varying levels of staff time. For example, the past implementation of the 1980 general management plan, which initiated the construction of recreational facilities in the recreation area, had substantial adverse impacts to park operations as the need for staff and funding during and after construction was most likely high. However, impacts of recreation management from the 1980 general management plan have declined and are currently realized by implementation of more recent planning and management documents, such as the Superintendent's Compendium (NPS 2009f) and personal watercraft regulations. The current implementation of the 1997 general management plan (NPS 1997a) would also have minimal impacts to staff time as much of the management has been reduced by the use of updated planning documents. However, the implementation of the OHV Interim Management Plan has resulted in adverse impacts to park operations and management, as it has required efforts from all divisions to develop and implement.

The inclusion of adjacent lands and establishment of a legislated boundary for the recreation area would provide more streamlined land administration for all agencies involved. The 2008 RPS/EIS (NPS 2008a) concluded that all agencies should realize some level of benefit to operations due to the new enabling legislation for the recreation area; improved wording in a new MOA between Reclamation and NPS; and increased consultation and cooperation among all agencies. However, the NPS would be charged with managing resources on an additional 10,040 acres. If Congress allocates sufficient funding as recommended by the RPS/EIS, the impact of managing these lands would result in long-term negligible to minor beneficial impacts to management and agency coordination, due to a corresponding increase in staff combined with the increased operational efficiencies that would accompany the formal boundary and improved coordination between the NPS and adjacent land management entities.

Other ongoing activities within the recreation area also contribute to cumulative impacts, and include noxious weed management, sensitive plant inventories, ongoing facilities and infrastructure maintenance, oversight of the Dickerson pit operation, cultural resources management, and oversight of the Invasive Mussel Prevention Program. In some instances, staff may be redirected from one activity to another to develop and implement these plans or actions. Depending on the amount of staff time needed and the number of these efforts occurring at the same time, there could be noticeable impacts to park staff, but assuming existing and future funding sources would be adequate to support these activities, the effects on overall park management and operations would not be appreciable. As a result, the cumulative impacts of past, present, and reasonably foreseeable future actions would be long term, negligible to minor, and adverse. Implementation of alternative A would not contribute appreciably to these effects.

Conclusion

Existing staffing and funding levels would be sufficient to continue the implementation of current motorized vehicle management practices, if formalized through the selection of alternative A. The total approximate cost of implementing alternative A would be $63,623. Implementation of alternative A would result in long-term, negligible to minor impacts to recreation area management and operations. Past, present, and reasonable foreseeable future actions, when combined with the impacts of implementing alternative A, would result in long-term, minor, adverse impacts to recreation area management and operations.

Alternative B: Designate Routes and Areas open to Motorized Vehicle Access Consistent with the 1997 General Management Plan

Table 12 provides the staffing and funding estimates for implementation of alternative B.

TABLE 12: COST ESTIMATE FOR IMPLEMENTATION OF ALTERNATIVE B

Division	Assumptions	Annual Costs ($)		
		Staff	Supplemental	Total
Resource and Visitor Protection	0.2 FTE required for continued motorized vehicle access management. 1 additional FTE would be needed to enforce closures required by the 1997 general management plan under alternative B.	100,000	0	100,000
Resource Stewardship and Science	0.2 FTE for weed monitoring/management. 0.3 FTE needed for ongoing restoration efforts aimed at closing and rehabilitating routes where motorized access no longer permitted. $3,000 for carsonite posts/signage. 0.25 FTE for archeological/paleontological condition assessments.	33,750	3,000	36,750
Facility Management	Alternative B would require signing of routes and the installation of up to 5 earthen berms on identified routes. Under this alternative, the Park Asset Management Plan would include annual routine maintenance on the signage only. This plan would not include maintenance on the routes other than for emergency repair (wash-out, etc).	6,602	10,370	16,972
Interpretation, Education, and Technology	0.1 FTE needed for visitor contacts, roving interpretation, web updates, creation of site bulletins, and bulletin board maintenance. 0.76 FTE for increased education outreach including web, personal services, etc. Approximately $5,000/year needed for printing of brochures, site bulletins, etc.	39,700	5,000	44,700
Total Annual Cost		180,052	18,370	198,422

Under alternative B, motorized vehicle access would be provided where consistent with the management prescriptions of the recreation area's 1997 general management plan, which would involve prohibiting motorized access in areas zoned Semi-Primitive/Non-Motorized. Approximately 14 miles of routes and 8,239 acres of area below the high water line (including 7,280 acres not traditionally used) would be open to public motorized vehicles. This includes approximately 4.9 miles of access routes designated as open on lands recommended for inclusion into the recreation area by the 2008 RPS/EIS (NPS 2008a). These existing routes, located in the upper Soap Creek area, would be open to motorized use under BLM/USFS travel management plans, and are connected to existing NPS routes. From an NPS management and

operations perspective, the addition of adjacent designated routes into the recreation area would increase the mileage of routes that need to be managed.

Sapinero Basin

Law enforcement staff would continue enforcement of the existing motorized vehicle regulations and resource protection measures. However, the Resource and Visitor Protection Division would require an additional full-time staff position to enforce the route closures proposed under alternative B. Due to the establishment of new speed limits and the route closures under this alternative, the Interpretation, Education, and Technology Division would require an additional 0.76 FTE to carry out increased outreach initiatives to educate visitors on the changes to motorized vehicle access at the recreation area. The division would also require approximately $5,000 annually for printing of brochures, site bulletins, and other educational materials related to motorized vehicle access regulations and closures. Alternative B would require the Facility Management Division to install up to five earthen berms and install and maintain signage on identified routes. This division would not provide maintenance on motorized access routes other than for repairs as a result of emergencies such as wash-outs. In addition to the costs of implementing alternative A, the Resource Stewardship and Science Division would require an extra 0.3 FTE to implement restoration efforts aimed at closing and rehabilitating routes where motorized access would no longer be permitted under alternative B. Implementation of alternative B would require increased efforts directed at providing additional public education initiatives and enforcing closures and rehabilitating areas closed to motorized vehicle access. As visitors become more aware of the changes to access and the closed areas recover, impacts associated with these efforts would decline over time. This alternative would require the installation of route closures on a substantial number of routes, especially those south of Iola Basin and north of Sapinero Basin. However, because the mileage of routes above the high water line open under alternative B would be much lower than that under alternative A, maintenance requirements would be reduced. Effects on certain divisions would be perceptible, but would be of a magnitude that would not result in a measurable change to recreation area operations or management. Therefore, impacts of managing motorized vehicle access under alternative B would be long term, minor, and adverse.

Cumulative Impacts

Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative B would be identical to those under alternative A and would be long term, minor, and adverse. Implementation of alternative B would not contribute appreciably to these effects.

Conclusion

Implementation of alternative B would require additional efforts from park staff and would necessitate creating one new position in the Resource and Visitor Protection Division to enforce the route closures associated with this alternative. The total approximate cost of implementing alternative B would be $198,422. Implementation of alternative B would result in long-term minor adverse impacts to recreation area management and operations. Past, present, and reasonable foreseeable future actions, when combined

with the impacts of implementing alternative B, would result in long term minor adverse impacts to recreation area management and operations.

Alternative C (Preferred Alternative): Designate Routes and Areas open to Motorized Vehicles and Amend the 1997 General Management Plan

Table 13 provides the staffing and funding estimates for implementation of alternative B.

TABLE 13: COST ESTIMATE FOR IMPLEMENTATION OF ALTERNATIVE C (PREFERRED ALTERNATIVE)

Division	Assumptions	Annual Costs ($)		
		Staff	Supplemental	Total
Resource and Visitor Protection	0.2 FTE required for continued motorized vehicle access management. 0.5 FTE required to enforce route closures under this alternative.	60,000	0	60,000
Resource Stewardship and Science	0.2 FTE for weed monitoring/management. 0.3 FTE needed for ongoing restoration efforts aimed at closing and rehabilitating routes where motorized access no longer permitted. $3,000 for carsonite posts/signage. 0.25 FTE for archeological/paleontological condition assessments.	33,750	3,000	36,750
Facility Management	Alternative C would require signing of routes and the installation of up to 5 earthen berms on identified routes. Under this alternative, the Park Asset Management Plan would include annual routine maintenance on the signage only. This plan would not include maintenance on the routes other than for emergency repair (wash-out, etc)	6,621	10,557	17,178
Interpretation, Education, and Technology	0.1 FTE needed for visitor contacts, roving interpretation, web updates, creation of site bulletins, and bulletin board maintenance. 0.76 FTE for increased education outreach, including web, personal services, etc. Approximately $5,000/year needed for printing of brochures, site bulletins, etc.	39,700	5,000	44,700
Total Annual Cost		140,071	18,557	158,628

Approximately 29 miles of traditionally used routes would be open to public motorized vehicle access under alternative C by making a minor amendment to the 1997 general management plan for the creation of a Semi-Primitive/Motorized zone. This zone would be applied to routes that have been traditionally used by the public in areas where such use is prohibited by management prescriptions of the 1997 general

management plan. Below the high water line of Blue Mesa Reservoir, approximately 958 acres traditionally used by the public would remain open to motorized access. Although not traditionally used due to access limitations caused by terrain or reservoir levels, the remaining area below high water would be closed to vehicular use to protect known and unknown resources, including cultural/paleontological sites. Pedestrian access would be permitted in these areas, outside of resource closures.

Under alternative C, public motorized access above the high water line would be much more than under alternative B, but less than half of the miles open under alternative A. As in all alternatives, this includes approximately 4.9 miles of routes designated as open on lands recommended for inclusion in the recreation area by the 2008 RPS/EIS. These existing routes, located in the upper Soap Creek area, would be open to motorized use under BLM/USFS travel management plans, and are connected to existing NPS routes. From an NPS management and operations perspective, the addition of adjacent designated routes into the recreation area would increase the mileage of routes that need to be managed.

Law enforcement staff would continue enforcement of the existing motorized vehicle regulations and resource protection measures. However, the Resource and Visitor Protection Division would require additional patrols to enforce the route closures proposed under this alternative. As in alternative B, the Interpretation, Education, and Technology Division would require an additional 0.76 FTE to carry out increased outreach initiatives and approximately $5,000 annually for printing of educational materials. Alternative C would require the Facility Management Division to install up to five earthen berms and install and maintain signage on identified routes. This division would not provide maintenance on motorized access routes other than for repairs as a result of emergencies such as wash-outs. For the Resource Stewardship and Science Division, the level of effort and funding under alternative C would be the same as that for alternative B, which required increased restoration efforts for rehabilitating route closures.

Implementation of alternative C would require increased efforts directed at providing additional public education initiatives and enforcing closures and rehabilitating areas closed to motorized vehicles. As visitors become more aware of the changes to access and the closed areas recover, impacts associated with these efforts would decline over time. Because the mileage of routes above the high water line open under alternative C would be lower than that under alternative A, maintenance requirements would also be reduced. Effects on certain divisions would be perceptible, but would be of a magnitude that would not result in a measurable change to recreation area operations or management. Therefore, impacts of managing motorized vehicle access under alternative C would be long term, minor, and adverse.

Cumulative Impacts

Past, present, and reasonably foreseeable future actions that have the potential for cumulative impacts under alternative C would be identical to those under alternative B and would be long term, minor, and adverse. Implementation of alternative C would not contribute appreciably to these effects.

Conclusion

Existing staffing levels would be sufficient to implement alternative C although it would require additional efforts from park staff. The total approximate cost of implementing alternative C would be $158,628. Implementation of alternative C would result in long-term minor adverse impacts to recreation area management and operations. Past, present, and reasonable foreseeable future actions, when combined with the impacts of implementing alternative C, would result in long-term minor adverse impacts to recreation area management and operations.