

**National Park Service
U.S. Department of the Interior**

**Curecanti National Recreation Area
Colorado**



Dickerson Pit Expansion Environmental Assessment

May 2004



Environmental Assessment

Dickerson Pit Curecanti National Recreation Area, Colorado

Summary

On February 17, 2003, Gunnison Gravel & Earthmoving (the operator) submitted an application for a Special Use Permit, which included a Plan of Operations, to the National Park Service (NPS) to expand mining operations at the Dickerson Pit (the pit), a mineral materials site located at the eastern end of Curecanti National Recreation Area (the park). The proposal requested an expansion of operations to include all 33.16 acres of the mineral estate. On May 26, 2003, the operator submitted a supplement to the application, which included additional operational information requested by the park.

This Environmental Assessment evaluates two alternatives for the operator to mine the Dickerson Pit for decomposed granite and intermixed materials. Alternative A evaluates baseline conditions under No Action. In this case, No Action means that the operator would not expand current operations. Additional impacts on the affected environment would be limited to those incurred from mining the remainder of the 12.4 acres that were approved for mining in 2000 under an NPS Special Use Permit.

Alternative B evaluates the Plan of Operations, as submitted by the operator and supplemented with additional mitigation measures, to mine 31.94 acres of the Dickerson Pit mineral estate (the total mineral estate of 33.16 acres, minus a 1.22-acre visual buffer that would remain undisturbed). Given the application of the required mitigation and the location of the site in relation to park resources, there would be no or negligible impacts on floodplains, wetlands, historic structures, ethnographic resources, cultural landscapes, museum collections, or park management and operations. Impacts on air quality, geology and soils, water quality, archeological resources, vegetation, wildlife, species of management concern, and visitor use and experience would be localized and both short term and long term, with adverse impacts ranging from negligible to moderate. Archeological sites on the property were surveyed and a Data Recovery Plan was developed. The park has stipulated that this plan be incorporated into Alternative B as required mitigation to limit adverse impacts on archeological sites to less than major levels. Alternative B is the Preferred Alternative. Alternative A is the environmentally preferred alternative, as that term is defined by the National Environmental Policy Act.

Public Comment

The Notice of Availability will be published in the *Daily Sentinel* in Montrose, Colorado and the *Gunnison Country Times* in Gunnison, Colorado. If you wish to comment on the Plan of Operations or the Environmental Assessment, please mail comments to the name and address below. These documents will be available for public review for 30 days from the date of publication in the newspapers. Please note that names and addresses of people who comment become part of the public record. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations, businesses, and individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

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1.0. PURPOSE AND NEED

This Environmental Assessment (EA) evaluates a proposal by Gunnison Gravel & Earthmoving (the operator) to expand existing operations at the mineral materials quarry owned by the Dickerson family within Curecanti National Recreation Area (the park). Pursuant to a lease agreement with the Dickerson family, the operator mines and removes decomposed granite and the materials intermixed therewith from the quarry. The quarry is located at the eastern entrance of the park, approximately 1.5 miles from the east entrance point. Figure 1.1 depicts the project location, which is referred to throughout this document as the pit, the mine, quarry, or the site.

Curecanti National Recreation Area is administered by the National Park Service (NPS), and as such is a unit of the National Park System. Although the Dickerson family owns the subsurface mineral rights of the quarry, totaling 33.16 acres, the federal government owns the surface of the quarry in addition to the surrounding park lands. The NPS is required by its laws, policies, and regulations to protect the park from any actions, including mineral operations at this quarry, which may adversely impact or impair park resources and values. Accordingly, the NPS has managed the mineral operations at the quarry under an NPS Special Use Permit since the 1980s. To date, operations at the quarry have been limited to approximately 12.4 acres.

The operation is currently subject to NPS Special Use Permit #IMR-CURE-5300-001, issued October 20, 2000. On January 16, 2001, the operator received approval from the State of Colorado to expand the existing operation to utilize the full 33.16-acre mineral estate owned by the Dickerson family, subject to NPS approval and conditions. On February 17, 2003, the operator submitted a proposed Plan of Operations to the NPS, requesting NPS permission for the expansion. In response to an April 3, 2003 request from the NPS, the operator submitted additional information about the proposed expansion on May 26, 2003. The NPS accepted the plan for review on September 15, 2003, and is now analyzing the impacts of the proposed mine expansion on the park's natural, cultural, recreational, and aesthetic resources and values.

This process, including this EA, is necessary to help the NPS make an informed decision about the operator's proposal, protect and prevent impairment to park resources and values, allow for a safe and enjoyable visitor experience, and determine whether an Environmental Impact Statement (EIS) is required.

This EA examines two alternatives. Alternative A (No Action/Current Management) is required by the National Environmental Policy Act of 1969 (NEPA) and describes the status quo. Under this alternative, the NPS would not permit the proposed mine expansion. In this case, Alternative A is the environmentally preferred alternative. Alternative B is the operator's proposed Plan of Operations, subject to Current Legal and Policy Requirements (see Table 1.1) and modified by NPS terms and conditions that would mitigate the major impacts of the mining operation. Although Alternative A is the environmentally preferred alternative, it would deny the mineral reservation owner the reasonable exercise of their remaining mineral rights. Therefore, Alternative B is the NPS-preferred alternative, since it allows the exercise of the owner's mineral rights and also protects park resources and values through application of appropriate mitigation.



Figure 1.1
Project Location Map

1.1. Objectives of Taking Action

Four objectives were identified by the planning team for this Environmental Assessment:

- Provide holders of private mineral rights reasonable access for development, to the extent it does not compromise the purposes of Curecanti National Recreation Area or conflict with the mission and mandates of the National Park System.
- Analyze potential impacts to cultural resources on or eligible for listing on the National Register of Historic Places as well as natural and socioeconomic resources.
- Develop measures to avoid, minimize, or mitigate adverse impacts to park resources and values, human health and safety, and visitor use and experience; and to prevent impairment to park resources and values.
- Involve the public in the environmental analysis process.

1.2. Special Mandates and Direction

This section describes the special mandates and direction that govern mineral management in Curecanti National Recreation Area, including the proposed expansion of the operations at the Dickerson Quarry. Special mandates and direction include the statutes and administrative documents that define the purpose and significance of the park and current legal and policy requirements, which are based on laws, Executive Orders, regulations, policies, and guidance documents.

1.2.1. Legislative and Administrative History of Curecanti National Recreation Area and the Dickerson Quarry

The 79.57-acre Dickerson property was originally acquired in fee simple from the U.S. Government in 1897, pursuant to the Cash Entry Law of 1820, for the congressionally stipulated price of \$1.25 per acre. Since approximately 1927, the quarry on the Dickerson property has served as a source of aggregate material for the surrounding community.

In 1956, Congress enacted the Colorado River Storage Project Act. Section 8 of the Act (now codified at 43 U.S. Code (U.S.C.) § 620(g)) authorized the Secretary of the Interior to acquire lands for the Colorado River Storage Project in order to construct dams; conserve the scenery, the natural, historic, and archeological objects, and the wildlife; and provide for public enjoyment. In 1958, the Bureau of Reclamation (BOR) and the NPS jointly made a request to the Secretary of the Interior for the NPS to be given the responsibility for carrying out Section 8.

Meanwhile, BOR began negotiating with private landowners in order to acquire their lands for the project. Negotiations between BOR and Mrs. Ruth Dickerson's representatives took place in late 1962 and early 1963. At that time, Mrs. Dickerson was selling decomposed granite from approximately 3 to 4 acres of the quarry to local companies that primarily marketed it to private individuals who used it to build or maintain roads, driveways, and parking areas, averaging approximately \$1,000 per year profit. It is clear from the negotiation documents that she intended to convey the quarry to the U.S. Government, along with the rest of her property. However, BOR refused to acquire the rights to the quarry, apparently due to its policy of only acquiring mineral estates when the mining operations would interfere with the dam workings. This left Mrs. Dickerson with no choice but to reserve the quarry, thus severing the mineral estate from the surface estate. Although the negotiation documents indicate that BOR and Mrs. Dickerson originally contemplated that she would reserve 10.24 acres, the actual April 4, 1963

Deed of Conveyance from Mrs. Dickerson to the U.S. Government shows that she reserved mineral rights on 33.16 acres.

Specifically, the 1963 deed reserved to Mrs. Dickerson:

“the perpetual right to mine and remove decomposed granite and the materials intermixed therewith from a portion of the conveyance described above, together with the right of ingress and egress over the same, but any rights reserved hereunder shall be exercised in such a manner as will not interfere with...any works of the proposed Curecanti Unit of the Colorado River Storage Project...”

Additionally, the deed reserved the right to prospect and remove all gas and oil in the 79.57 acres, the rights to coal and minerals belonging to third parties, and existing rights-of-way.

At some point between 1958 and 1965, the Secretary of the Interior designated the NPS as the agency responsible for implementing the recreational and conservation purposes of the Colorado River Storage Project Act. In 1965, the NPS assumed jurisdiction over all lands and waters within the project area, including the quarry, pursuant to the delegation, Congressional authority at 16 U.S.C. § 17j-2(b), and a Memorandum of Agreement with BOR.

Since then, the Dickerson property has been leased to at least two operators. The current operator is Gunnison Gravel & Earthmoving. To date, the operators have mined and removed decomposed granite and the various large granite boulders and blocks that are surrounded by the decomposed granite. As stated above, the NPS has regulated the quarry since the 1980s pursuant to NPS Special Use Permits in accordance with NPS regulations at 36 Code of Federal Regulations (CFR) Parts 1 and 5, *NPS Management Policies* (2001c), and related guidance.

1.2.2. The NPS Organic Act, as amended

The NPS Organic Act (16 U.S.C. §§ 1 *et seq.*) provides the fundamental management direction for all units of the National Park System. Section 1 states that the NPS shall:

“...promote and regulate the use of the federal areas known as national parks, monuments, and reservations...by such means and measure as conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

The National Park System General Authorities Act of 1970 (16 U.S.C. § 1a-1) affirms that while all National Park System units remain "distinct in character," they are "united through their interrelated purposes and resources into one National Park System as cumulative expressions of a single national heritage." In other words, the Act clarifies that the NPS Organic Act and other protective mandates apply equally to all units of the system. Subsequently, the 1978 Redwood Act amendments to the General Authorities Act clarified Congress' mandate to the NPS to protect park resources and values. The 1978 Act states, in part: "The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established except as may have been or shall be directly and specifically provided by Congress" (16 U.S.C. § 1a-1).

1.2.3. The Non-Impairment Mandate

The NPS Organic Act, as amended by the 1970 General Authorities Act and the 1978 Redwood Act amendments, prohibits the impairment of park resources. The NPS Management Policies (2001) provide guidance about the definition of an impairment, the park resources that may not be impaired, and how the NPS shall prevent potential impairment and rectify ongoing impairments.

An impact to any park resource or value may, or may not, constitute an impairment. Not all impacts are impairments. An impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.

The *NPS Management Policies* (NPS 2001c) explain that an impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- 1) Necessary to fulfill a specific purpose identified in the establishing legislation or proclamation of the park;
- 2) Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- 3) Identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated, of an action necessary to preserve or restore the integrity of park resources or values.

NPS Management Policies explain that "resources and values" mean the full spectrum of tangible and intangible attributes for which the parks are established and are being managed, including the Organic Act's fundamental purposes (as supplemented), and any additional purposes as stated in a park's establishing legislation. Park resources and values that are subject to the no impairment standard include: the biological and physical processes which created the park and that continue to act upon it; scenic features; natural visibility; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals. Additional resources and values that are subject to the non-impairment standard include the park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the National Park System.

For these reasons, Chapter 3 of this EA, *Affected Environment and Environmental Consequences*, provides an analysis of the potential for impairment for each of the natural and cultural resource topics covered in this EA.

1.2.4. Special Use Permits

The NPS's authority to regulate the exercise of the reserved mineral rights at the Dickerson Pit is derived from the Property Clause of the United States Constitution. The Property Clause provides that "Congress shall have the Power to dispose of and make all needful Rules and

Regulations respecting the Territory or other Property belonging to the United States...” (U.S. Constitution Article IV, Section 3, Clause 2).

Pursuant to the Property Clause, Congress has the power to regulate, through legislation and through delegation to federal agencies, activity on both federal and nonfederal lands in order to protect the designated purpose of federal lands. Courts have upheld the regulation of mining activities by federal agencies as being within the power granted under the Property Clause.

Congress directed the NPS to promulgate rules and regulations deemed necessary and proper for the use and management of the National Park System (see 16 U.S.C. §1 and §3). The NPS regulations that apply to Curecanti National Recreation Area, including the Dickinson Pit, include the regulations at 36 CFR Parts 1 through 6. Specifically, 36 CFR § 5.3 provides that business operations in park areas are prohibited unless conducted in accordance with a permit or other written agreement. 36 CFR § 1.6 authorizes park superintendents to issue permits for activities that are otherwise prohibited in park areas. Section 1.6 also specifies that the permits for such activities shall contain terms and conditions that protect park resources and public safety, and ensure compliance with all applicable laws, regulations, and policies. *NPS Management Policies* § 8.7.3 (NPS 2001c) clarifies the application of the above-cited regulations to nonfederal mineral interests such as those at the Dickerson Quarry.

Pursuant to *Reference Manual # 53: Special Park Uses* (NPS 2000b), NPS Special Use Permits may only be issued if the special park use will not:

- Cause injury or damage to park resources; or
- Be contrary to the purposes for which the park was established; or
- Unreasonably impair the atmosphere or peace and tranquility maintained in wilderness, natural, historic or commemorative locations within the park; or
- Unreasonably interfere with the interpretive visitor service or other program activities, or with the administrative activities of the NPS; or
- Substantially impair the operation of public facilities or services of NPS concessionaires or contractors; or
- Present a clear and present danger to public health and safety; or
- Result in significant conflict with other existing uses.

Special Use Permits must contain provisions, such as a performance bond, that will protect the park’s interests. The permit must also contain any other terms and conditions that the park deems necessary to prevent impairment and otherwise protect park resources or public safety (see 36 CFR § 1.6(e)). In this case, the permit would be a long term permit. According to *Reference Manual # 53: Special Park Uses*, the park will need to conduct an annual administrative and operations review of the approved operation to determine the continued appropriateness of the operation and its continued lack of impairment to park resources and values. Special Use Permits may be revoked upon the permittee’s violation of applicable law or any conditions in the permit. In addition to any terms in the Special Use Permit, the operator must follow all applicable laws and regulations. Table 1.1 summarizes many, but not all, of the statutes, regulations, Executive Orders, and policies that govern the exercise of nonfederal mineral rights in National Park units.

**Table 1.1 – Current Legal and Policy Requirements
Governing Nonfederal Mineral Operations**

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
Statutes and Applicable Regulations	
NPS Organic Act of 1916, as amended, 16 U.S.C. §§ 1 <i>et seq.</i>	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources.
National Park System General Authorities Act, 16 U.S.C. §§ 1a-1 <i>et seq.</i>	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources.
National Park Service Omnibus Management Act of 1998, 16 U.S.C. §§ 5901 <i>et seq.</i>	Any living or nonliving resource.
NPS Special Use Permit – 36 CFR Parts 1 and 5	All, e.g., air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, threatened and endangered species, visitor use, and experience.
16 U.S.C. § 19jj (commonly referred to as Park System Resource Protection Act)	Any living or nonliving resource that is located within the boundaries of a unit of the National Park System, except for resources owned by a nonfederal entity.
American Indian Religious Freedom Act, as amended, 42 U.S.C. §§ 1996 – 1996a; 43 CFR Part 7	Cultural and historic resources.
Antiquities Act of 1906, 16 U.S.C. §§ 431-433; 43 CFR Part 3	Cultural, historic, archeological, and paleontological resources.
Archeological Resources Protection Act of 1979, 16 U.S.C. §§ 470aa – 470mm; 18 CFR Part 1312; 32 CFR Part 229; 36 CFR Part 296; 43 CFR Part 7	Archeological resources.
Clean Air Act, as amended, 42 U.S.C. §§ 7401-7671q; 40 CFR Parts 23, 50, 51, 52, 58, 60, 61, 82, and 93; 48 CFR Part 23	Air resources.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601-9675; 40 CFR Parts 279, 300, 302, 355, and 373	Human health and welfare and the environment
Endangered Species Act of 1973, as amended, 16 U.S.C. §§ 1531-1544; 36 CFR Part 13; 50 CFR Parts 10, 17, 23, 81, 217, 222, 225, 402, and 450	Plant and animal species or subspecies and their habitat that have been listed as threatened or endangered by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service.
Federal Insecticide, Fungicide, and Rodenticide Act, as amended (commonly referred to as Federal Environmental Pesticide Control Act of 1972), 7 U.S.C. §§ 136 <i>et seq.</i> ; 40 CFR Parts 152-180, except Part 157	Human health and safety and the environment.
Federal Land Policy and Management Act of 1976, 43 U.S.C. §§ 1701 <i>et seq.</i> ; 43 CFR Part 2200 for land exchanges and 43 CFR Parts 1700-9000 for all other BLM activities	Federal lands and resources administered by the Bureau of Land Management (BLM).
Federal Water Pollution Control Act of 1972 (commonly referred to as Clean Water Act), 33 U.S.C. §§ 1251 <i>et seq.</i> ; 33 CFR Parts 320-330; 40 CFR Parts 110, 112, 116, 117, 230-232, 323, and 328	Water resources, wetlands, and waters of the United States.

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
Historic Sites, Buildings, and Antiquities Act (Historic Sites Act of 1935), 16 U.S.C. §§ 461-467; 18 CFR Part 6; 36 CFR Parts 1, 62, 63 and 65	Historic sites, buildings and objects.
Lacey Act, as amended, 16 U.S.C. §§ 3371 <i>et seq.</i> ; 15 CFR Parts 10, 11, 12, 14, 300, and 904	Fish, wildlife, and vegetation.
Migratory Bird Treaty Act, as amended, 16 U.S.C. §§ 703-712; 50 CFR Parts 10, 12, 20, and 21	Migratory birds.
National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321 <i>et seq.</i> ; 40 CFR Parts 1500-1508	The human environment (e.g., cultural and historic resources, natural resources, biodiversity, human health and safety, socioeconomic environment, visitor use, and experience).
National Historic Preservation Act of 1966, as amended, 16 U.S.C. §§ 470-470x-6; 36 CFR Parts 60, 63, 78, 79, 800, 801, and 810	Cultural and historic properties listed in or determined to be eligible for listing in the National Register of Historic Places.
Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001-3013; 43 CFR Part 10	Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony.
Noise Control Act of 1972, 42 U.S.C. §§ 4901-4918; 40 CFR Part 211	Human health and welfare.
Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 <i>et seq.</i> ; 40 CFR Parts 240-280; 49 CFR Parts 171-179	Natural resources, human health, and safety.
Rivers and Harbors Act of 1899, as amended, 33 U.S.C. §§ 401 <i>et seq.</i> ; 33 CFR Parts 114, 115, 116, 321, 322, and 333	Shorelines and navigable waterways, tidal waters, and wetlands.
Safe Drinking Water Act of 1974, 42 U.S.C. §§ 300f <i>et seq.</i> ; 40 CFR Parts 141-148	Human health and water resources.
Executive Orders	
Executive Order 11593 – Protection and Enhancement of the Cultural Environment, 36 Fed. Reg. 8921 (1971)	Cultural resources.
Executive Order 11988 - Floodplain Management, 42 Fed. Reg. 26951 (1977)	Floodplains, human health, safety, and welfare.
Executive Order 11990 – Protection of Wetlands, 42 Fed. Reg. 26961 (1977)	Wetlands.
Executive Order 12088 – Federal Compliance with Pollution Control Standards, 43 Fed. Reg. 47707 (1978)	Natural resources, human health, and safety.
Executive Order 12630 – Governmental Actions and Interference with Constitutionally Protected Property Rights, 53 Fed. Reg. 8859 (1988)	Private property rights, and public funds.
Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, amended by Exec. Order No. 12948, 60 Fed. Reg. 6379 (1995)	Human health and safety.
Executive Order 13007 – Indian Sacred Sites, 61 Fed. Reg. 26771 (1996)	Native Americans' sacred sites.
Executive Order 13112 – Invasive Species, 64 Fed. Reg. 6183 (1999)	Vegetation and wildlife.
Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds, 66 Fed. Reg. 3853 (2001)	Migratory birds.

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
Policies, Guidelines and Procedures	
NPS Management Policies (2001)	All resources including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources.
Dept. of the Interior, Departmental Manual, DM 516 –NEPA policies	All resources including cultural resources, historic resources, natural resources, human health, and safety.
Dept. of the Interior, Departmental Manual, DM 517 –Pesticides	Human health, safety, and the environment.
Dept. of the Interior, Departmental Manual, DM 519 – Protection of the Cultural Environment	Archeological, prehistoric resources, historic resources, Native American human remains, and cultural objects.
NPS Director’s Order -12 and Handbook – National Environmental Policy Act (2001)	All resources including natural and cultural resources, human health and safety, socioeconomic environment, and visitor use.
NPS Director’s Order 28 – Cultural Resource Management	Cultural, historic, and ethnographic resources.
NPS 66 – Minerals Management Guideline	Natural resources, human health, and safety.
NPS 77 – Natural Resources Management Guideline	Natural resources.
NPS Director’s Order 77-1 – Wetland Protection	Wetlands.
NPS Director’s Order 77-2 – Floodplain Management Guideline	Floodplains.
Secretary of the Interior’s “Standards and Guidelines for Archeology and Historic Preservation,” 48 Fed. Reg. 44716 (1983), also published as Appendix C of NPS Director’s Order 28 – Cultural Resource Management	Cultural and historic resources.
Government-to-Government Relations with Native American Tribal Governments, Presidential Memorandum signed April 29, 1994	Native Americans – Tribal rights and interests.

1.2.5. Park Planning Documents

Approved park planning documents also provide a framework for determining how nonfederal mineral operations are conducted within Curecanti National Recreation Area.

The General Management Plan (GMP) is the major planning document for all National Park System units. The GMP sets forth the basic philosophy of the unit and provides strategies for resolving issues and achieving identified management objectives required for resource management and visitor use. The GMP includes environmental analysis and other required compliance documentation. A GMP was completed for Curecanti National Recreation Area in 1997.

The Resource Management Plan (RMP) is a strategic planning document and a key factor in effective management and preservation of park resources. The RMP outlines strategies for protecting, perpetuating, and preserving the natural and cultural resources of Curecanti National Recreation Area. The RMP for Curecanti National Recreation Area was recently revised in 1999.

The Strategic Plan, required by the Government Performance and Results Act of 1993, outlines the long term goals for the park and the steps to accomplish these goals. The current Strategic Plan was completed for Curecanti National Recreation Area in 2000 and covers fiscal years 2001 through 2005.

1.3. Issues and Impact Topics Evaluated

During the development of the operator’s proposed Plan of Operations, the NPS discussed with the operator the resources, values, and other concerns that could be potentially impacted by the proposed mining activity and expansion. In addition, the NPS sought input from individuals, organizations, and government agencies including the Colorado State Historic Preservation Officer (SHPO) and the Colorado Department of Minerals and Geology. In December 2003, the NPS mailed 190 public scoping newsletters and posted it on the Curecanti National Recreation Area Web site. Scoping involved defining appropriate alternatives, impact determinations, mitigation measures, and identification of major issues. Based on scoping, the NPS identified the following park resources, values, and other concerns:

- Nonfederal mineral development
- Air quality
- Geology and soils
- Vegetation
- Wildlife
- Species of management concern (threatened, endangered, special status species)
- Cultural resources
- Visitor use and experience
- Water resources and floodplains
- Wetlands
- Park management and operations
- Local and regional economics

Based on a preliminary evaluation of these park resources, values, and other concerns, several were eliminated from detailed analysis because there would be negligible or minor impacts from the proposed action. These include floodplains, wetlands, park management and operations, local and regional economics, historic structures, ethnographic resources, cultural landscapes, and museum collections (see Section 1.4 for more details and definitions).

For the remaining resources and values, issue statements were developed to define problems or benefits associated with the proposal to expand the mineral operations at the Dickerson Pit. The issue statements in Table 1.2 describe a cause-and-effect relationship between an activity and a resource, value, or concern. The issue statements were used in developing and evaluating alternatives.

Table 1.2 – Issue Statements

Impact Topic	Issue Statement(s)
Nonfederal Mineral Development	<ul style="list-style-type: none"> • The NPS permitting process, regulatory requirements, and operating stipulations may increase the cost to operate on park lands, compared to operating on nonfederal lands. These increased costs could reduce income to mineral owners (or mineral interest holders) and operators, and influence an owner’s or operator’s decision to defer, modify, undertake as planned, or not conduct certain nonfederal operations.
Air Quality	<ul style="list-style-type: none"> • Vehicle use on and off paved roads; exhaust from combustion of gasoline and diesel-powered vehicles and equipment used for mining, crushing, screening, loading, and transporting mineral materials would increase emissions of particulate matter, carbon dioxide (CO₂) and nitrous oxides (NO_x), which could affect air quality, including the generation of dust and visibility in the general vicinity of the operations.

Impact Topic	Issue Statement(s)
Geology and Soils	<ul style="list-style-type: none"> • The mining and removal of decomposed granite and intermixed materials would result in the loss of geologic materials and soil productivity on up to 31.94 acres and could cause geohazards from high walls and unstable slopes. • The release of hydrocarbons or other contaminating and hazardous substances from vehicles and equipment could alter the chemical and physical properties of the soil in the vicinity of the operations. Changes in soil properties could result directly from contact with contaminants on site or indirectly via runoff from contaminated areas.
Vegetation	<ul style="list-style-type: none"> • Mining, processing, and transporting decomposed granite and intermixed materials would result in the loss of vegetation on up to 31.94 acres. Loss of vegetation could alter wildlife habitat and species composition, increase stormwater runoff, and increase erosion. • The release of hydrocarbons and contaminating or hazardous substances could damage or kill vegetation directly via contact with contaminants on site or indirectly via pathways from contaminated areas. • Disturbances/removal of native vegetation could lead to the unintentional spread and establishment of non-native plant species already within the disturbed areas of the pit as well as those transported in or on drilling and maintenance equipment.
Wildlife	<ul style="list-style-type: none"> • The mining, processing, and transporting of decomposed granite and intermixed materials (including blasting, vehicle use, processing, and removal of mined materials) could result in increased predation in adjoining undisturbed areas; directly harm or kill wildlife; and disrupt wildlife feeding, denning, nesting, spawning/reproduction, and other behavior. The mining operations would result in the continued avoidance of the area by wildlife due to increased noise and human presence. • Loss or modification of wildlife habitat would occur from the expansion of the mining operation. These activities could alter the nature of the habitat between the pit and the surrounding lands, increase human access, and alter wildlife species, composition, and migration. • Elevated noise from occasional blasting activity, crushing and screening, and loading trucks with mined materials could affect wildlife in close proximity to the pit. • Stormwater that may collect and drain from the pit could attract, harm, and possibly kill wildlife. • The release of hydrocarbons and hazardous or contaminating substances from vehicles and equipment could injure wildlife. The adverse effects could become worse over time if wildlife species ingest the contaminants and are consumed by other wildlife species.
Species of Management Concern	<ul style="list-style-type: none"> • Elevated noise from occasional blasting activity, crushing and screening, and loading trucks with mined materials could affect peregrine falcons, ferruginous hawk, or swift fox that could be nesting in or using areas in close proximity to the pit. • Mining operations, including vegetation removal, could adversely affect the Gunnison milkvetch or Rollin's twinpod (state imperiled species).
Archeological Resources	<ul style="list-style-type: none"> • Expanding the mining operation into an area where a National Register of Historic Places-eligible archeological site is located would result in the loss of the archeological resources if not mitigated.
Visitor Use and Experience	<ul style="list-style-type: none"> • The mining operation could pose a threat to human health and safety from geohazards, elevated noise levels, use of large equipment and vehicles (particularly from vehicles with less maneuverability and visibility), and vehicular traffic conflicts on access roads. • The mining operation could adversely affect air quality, alter scenic resources, increase background sound levels, and could degrade the quality of visitor uses and experiences in the park.

1.4. Issues and Impact Topics Eliminated from Further Analysis

According to NPS policy, certain issues that have been identified may be eliminated from detailed analysis if the expected adverse impacts would be negligible to minor with the implementation of the required mitigation across all alternatives. The interdisciplinary team determined that there were some resources that would not create more than negligible or minor adverse impacts and were not mentioned as particular concerns during public scoping. Therefore, the following topics were eliminated from further analysis in this EA for the reasons described.

1.4.1. Environmental Justice

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed action would not have disproportionately high and adverse human health or environmental effects on minorities or low-income populations or communities as defined in the U.S. Environmental Protection Agency’s (EPA’s) Environmental Justice Guidance (1998). Therefore, environmental justice was dismissed as an impact topic in this EA.

1.4.2. Prime and Unique Farmlands

In August 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture’s Natural Resources Conservation Service as prime or unique. Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland is defined as soil that produces specialty crops such as fruits, vegetables, and nuts. There were no prime or unique farmlands located in or near the project site; therefore, the topic of prime and unique farmlands was dismissed as an impact topic in this EA.

1.4.3. Historic Structures, Ethnographic Resources, Cultural Landscapes, Museum Collections

The following provides definitions of the different cultural resources impact topics dismissed from further evaluation.

1. Historic structures include standing structures, irrigation canals, railroad grades, etc. and is a collective term for all entries in the National Register of Historic Places.
2. An ethnographic resource is any “site, structure, object, landscape or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it” (DO-28, *Cultural Resource Management Guideline*, 181).
3. A cultural landscape is a geographic area, including both cultural and natural resources associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.
4. A museum collection include prehistoric and historic objects, artifacts, works of art, archival documents, and natural history specimens

There are no known historic structures, cultural landscapes, or ethnographic resources on or near the pit site. Also, the actions under either alternative would not have adverse impacts on park museum collections. The park staff consulted with the culturally affiliated tribes, which produced one response that did not indicate any issues or concerns with the project. The park will continue to consult with the tribes as operations progress. For these reasons, these cultural resource topics were not carried through for detailed analysis.

1.4.4. Local and Regional Economics

Local and regional economics was dismissed as an impact topic because the outcome of whether or not the pit would be expanded to include an additional 19.5 acres would have a negligible impact on local and regional economies. Economic impacts to local or regional supplies of mineral materials are discussed under “Nonfederal Mineral Development.”

1.4.5. Floodplains

The Dickerson Pit site does not contain any surface water resources, and the nearest floodplain is the Gunnison River Floodplain, located approximately 400 feet to the south and across U.S. Highway (US) 50. Because none of the proposed activities at the pit would affect floodplain functions or values would be affected, this topic was dismissed from further analysis.

1.4.6. Wetlands

Similar to water resources, this topic was dismissed because there are no wetlands on the site, and any downstream wetlands would be protected by the use of the settling pond and erosion control methods that are part of the Plan of Operations. The closest wetlands in the direct path of stormwater discharge from the site are located across US 50, along the Gunnison River. Wetlands associated with Beaver Creek are at least 500 feet away from the site boundary, separated from any site activities by a wooded hillside, and stormwater would not be directed toward Beaver Creek. Therefore, since there would be no discernible direct or indirect impacts to wetlands, this topic was dismissed from further analysis.

1.4.7. Park Management and Operations

This was dismissed as an impact topic because the extent of additional management required by the proposed action would have few additional impacts to the park. The park staff and staff from the NPS central offices, such as the Geologic Resources Division, would continue with the same type of monitoring of operations and mineral characterization as they have been performing. All archeological recovery would be done under contract, with negligible to minor impacts to park staff who would oversee this effort. Rare plant salvage and monitoring and exotic plant management and monitoring would place additional negligible to minor impact on park staff.

2.0. ALTERNATIVES

Two Alternatives, A and B, are described and evaluated in this EA. Alternatives that were considered but dismissed from further analysis are then described. An analysis for selecting the environmentally preferred alternative is also provided. This section concludes with three summary tables comparing the two alternatives.

2.1. Alternative A, No Action

The No Action Alternative is required under the NEPA and establishes a baseline or benchmark from which to compare the effects of allowing the proposed activity to proceed. Under this alternative, the proposed mine expansion would not occur. Existing operations would continue on the approximately 12.4 acres subject to the existing NPS Special Use Permit #IMR-CURE-5300-001, issued on October 20, 2000. Figure 2.1 depicts the quarry and this area, referred to as "Phase 1" of the mining operation. Figure 2.2 provides an aerial photo view of the site as of 2003. The whitened area is the area that has already been mined. No other private lands exist within the park in this area.

Mining would continue until all the permitted acreage is mined, which would take approximately 1 to 3 years to complete. Once the entire 12.4 acres is mined out, the disturbed lands would be reclaimed per the approved reclamation plan and the mitigation provided for in the permit, which would include revegetation of the site. The remaining undisturbed portion of the site (approximately 20.76 acres) would remain undeveloped and unmined, in its current condition. Table 2.1 summarizes the mitigation that would occur under Alternative A. A description of mining operations and reclamation that would occur under Alternative A are provided in Section 2.3.

2.2. Alternative B, Proposed Action

Under Alternative B, Proposed Action, current mining operations would be expanded to include an additional 19.5 acres of the quarry site (assuming all this material is decomposed granite and intermixed materials). This acreage is the remainder of the total 33.16 acres of the mineral estate that was not included in the 2000 Special Use Permit, minus a 1.22-acre strip that would be preserved as a visual buffer. Upon completion, Alternative B would result in a total mined area of approximately 31.94 acres.

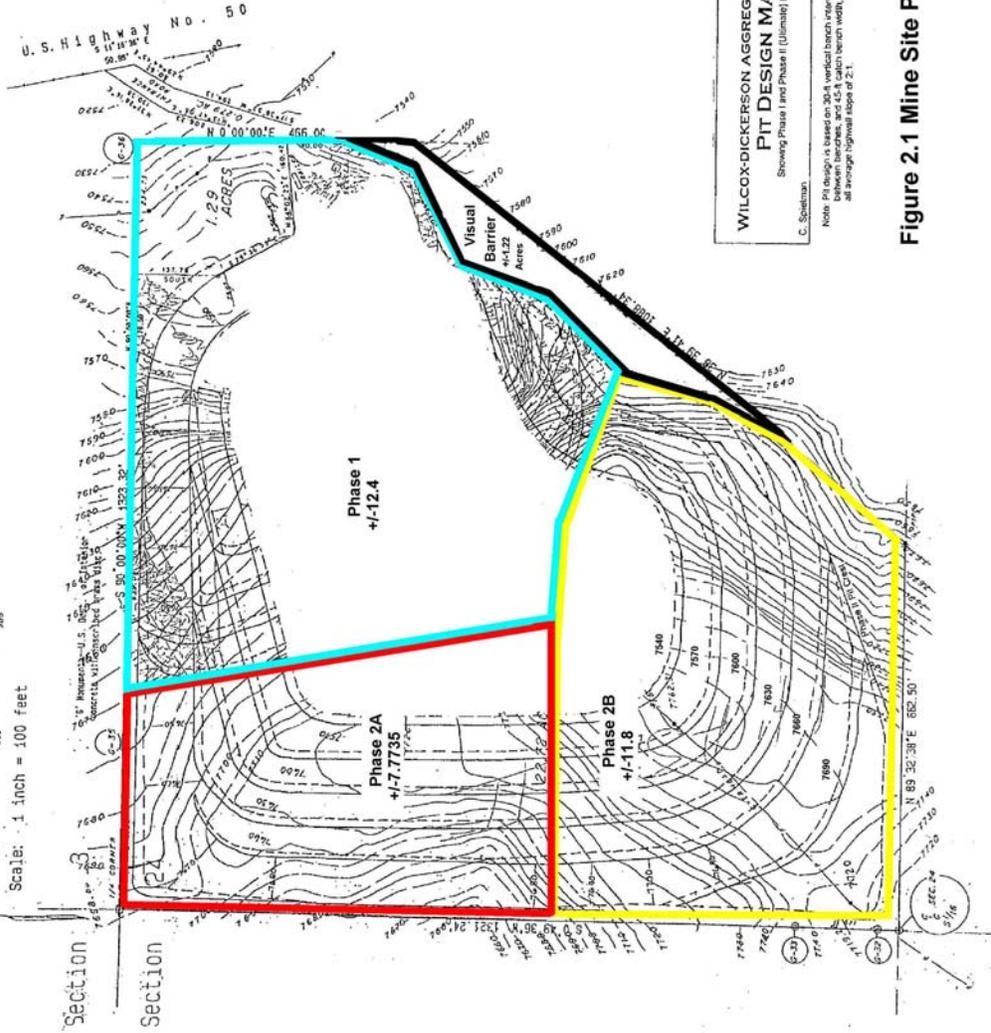
Mining of the additional 19.5 acres would occur over a period of up to 42 years, at a rate dependent on market demand, but estimated by the operator to be approximately 800 to 1,000 tons per day. At the completion of mining, all disturbed lands would be reclaimed per the approved reclamation plan and permit conditions, which would include regrading and revegetation of the area. Figure 2.1 depicts the quarry and the area mined to date (Phase 1), plus the proposed expansion area consisting of Phases 2A and 2B, and the visual buffer.

Mitigation has been included in Alternative B to protect park resources, especially archeological sites located on the property. The operator included certain mitigation measures in the submitted Plan of Operations, dated February 17, 2003, and supplemented by another submittal on May 26, 2003. In addition, there is mitigation stipulated by the NPS and other regulatory entities that must be included in this alternative in order to protect park resources and reduce impacts to the archeological sites to less than major levels. This mitigation, which includes an Archeological Data Recovery Plan, has been agreed to by the SHPO. Tables 2.2 and 2.3 summarize the operator-specified mitigation and the other stipulated mitigation that would be

Dickerson Granite Pit
Permit No. M - 78 - 305
 located within the

North 1/2 of the Northeast 1/4 of Section 24
 Township 49 North, Range 2 West of the Sixth P.M.

Scale: 1 inch = 100 feet



- Phase 1 area
- Phase 2A area
- Phase 2B area
- Visual Barrier

+/-31.94 acres total disturbance
+/-1.22 acres Visual Barrier

Figure 2.1 Mine Site Plan with Phases

completed under Alternative B. A description of mining operations and reclamation that would occur under Alternative B are provided in the following sections.

2.3. Description of Mining Operations

The basic operational procedures and equipment that would be used to mine the decomposed granite and intermixed materials would be the same under both alternatives and would involve drilling, blasting, crushing, and hauling of the crushed mineral material. These operations are described below and apply to both alternatives. However, it should be remembered that the extent of operations would be very limited under Alternative A and expanded both in duration and extent under Alternative B. Table 2.5, Comparative Summary of Alternatives provided at the end of this chapter, summarizes the main features of operations for Alternatives A and B.

Ripping, Drilling, and Blasting – Most of the decomposed granite material is soft enough to be ripped by a bulldozer. Small areas of more competent rock need to be blasted to be removed. The operator begins a new section of mining by ripping the material or by drilling holes about 12 to 15 feet down into the resistant mineral material, and blasting out benches. Blasting is performed using ammonium nitrate-based explosives that are set into the shot holes. Benching follows all Mine Safety and Health Administration requirements and results in the appearance of steps along the face of the rock. Blasting is contracted out and currently occurs once or twice a year, lasting a few days at a time. Under Alternative B, frequency of blasting may increase and blasting may last up to 1 to 2 weeks, depending on market demands. Traffic is halted during blasting by flagging cars and using appropriate signage. Explosives are not stored on site.

Extraction -- The loosened material is then pushed down slope to the stockpile/processing area using large bulldozers. The maximum operating range of the bulldozers on slopes is approximately 26°-28° or 2:1 (horizontal:vertical). The material is then sorted by bulldozer or loader into pit run (no processing), fines, oversize (rip rap), and material to be crushed and screened.

Crushing and Screening – The crusher is a contracted mobile unit with screening equipment and a stack conveyor. The crusher crushes the blasted rock into appropriate sizes for its intended use. The crusher is diesel-powered and has air pollution controls and any required permits, noise suppression, and a water spray to control dust. Crushers may not remain on site for more than 90 days unless the Superintendent approves this in writing. Average crusher production is 250 tons per hour.

Stockpiling/Scales – Once the mineral material is separated, crushed and/or screened, it is conveyed to a stockpile and remains on site until it is loaded into trucks for transport off site. Semi-portable truck scales are on the site for weighing material prior to transport.

Material Hauling – Various pieces of equipment are used to move material from one area to another and to load material into trucks. These include wheel loaders, trackhoe/hydraulic shovels, 25- to 65-ton bulldozers, scrapers, and dump trucks.

Off-site Transport – The stockpiled material is loaded into 10- to 22-ton dump trucks, which exit the pit onto US 50 (both east- and westbound). Cars are not slowed or stopped as trucks enter the highway. Current production that would continue under Alternative A would result in an average of one to two trucks per day, with maximum truck traffic reaching 120 trucks on the busiest days, while truck traffic under Alternative B could reach 120 trucks per day during the highest production summer days, with an expected average of less than 40 trucks per day.

Other Equipment/Operations – Under both alternatives, a portable asphalt plant may be used, but will not be on site for more than 90 days. The Plan of Operations for Alternative B also mentions the possibility of a portable concrete plant.

Waste Disposal – Under both alternatives, wastes produced by the operations (trash, debris, small spill residues) would be hauled off site to an approved solid waste disposal facility such as the Gunnison Landfill. No burning of wastes would be allowed, and chemical toilets would be used.

Stormwater Management – Both alternatives would use the existing storm drainage ditches that follow along the access road and holding ponds on the site for control of stormwater and associated erosion, and the reduction of sediment in waters leaving the site. Under Alternative A, stormwater would be controlled by existing berms, ditches, and sediment basins near the scales, and the drainage ditches have catch structures to slow water and drop sediments. Under Alternative B, these same structures would be used, and additional settling structures will be constructed by the operator as the floor of the pit expands. The pit floor will be designed in a manner that contains practically all discharge from the site, and any discharge that leaves the site will meet the State of Colorado, Water Quality Control Division – Colorado Discharge Permit System requirements.

Hazardous Material Management – Under both alternatives, fuels and oils needed for the equipment would be stored in temporary mobile tanks or small containers and drums. No permanent fuel tanks would be permitted. Service trucks would carry less than 110 gallons of fuel. Spills would be cleaned up immediately and for all releases to the ground of contaminating or toxic substances in excess of 20 gallons, the operator will promptly report the following information to the park superintendent or his designee: the time the spill was discovered; the type of product released, the location, estimated spill volume, cause of spill, area covered, estimated rate of release if ongoing, direction of movement, description of contaminated area, proximity to surface waters or roads, weather conditions, what steps are being taken to remedy the situation, and initial response equipment required. No pesticides would be used unless previously approved.

Traffic Control – Under Alternative A, no additional traffic control would be required. The increase in truck traffic proposed under Alternative B would not require additional traffic control.

Hours/days of Operation – Under Alternative B, mining would occur from March 1 through December 31, during daylight hours only. Processing would occur from April 1 through December 31. Under Alternative A, the remainder of the 12.4 acres would also be mined during these periods, but mining would likely not occur during the entire period due to the small amount of mineral material remaining.

2.4. Sequence and Extent of Operations for each Alternative

Although mining operations would be similar for both alternatives, the extent and the sequencing of the mining would vary considerably, as described below.

Alternative A (No Action) – Under this alternative, production would be limited to what is needed to remove the remainder of the mineral materials within the 12.4 acres, which is located on the northeast end of the mineral reservation. No phasing of operations would be done, given the small amount of material to be removed. Average current production at the pit is 10,000 tons per year, and the highest production to date has been 15,000 tons per year.

Alternative B (Proposed Action) – Under this alternative, production would vary, depending on market demands; however, the operator’s proposed plan of operations estimated that production could reach 800 to 1,000 tons per day. The proposed expansion would be done in a phased approach, moving from one area of the pit to another, proceeding from the top down to the pit floor. Mining would begin in one area of the remaining unmined portion of the pit, at the highest elevation of the pit wall. Material would be removed down to approximately 50 vertical feet below the beginning level. Once this material was removed and processed, mining would proceed to a different area or phase. Mining would again proceed about 50 feet down, and then operations would move to a different area and continue down the slope, and so forth, until the pit floor is eventually reached at the 7,540 foot elevation. If the mining operation follows the two phases shown in Figure 2.1, the amount of material removed and estimated time to do this are summarized as follows:

	PHASE 2A	PHASE 2B
ACREAGE	7.725	11.8
TOTAL TONS	340,000	620,000
TOTAL TIME TO MINE OUT	4-12 years	8-20 years

Between phases, the park would monitor the operation to evaluate if the material mined continues to consist of decomposed granite and intermixed materials and to ensure no unforeseen adverse impacts are occurring. Monitoring of any archeological site recovery would occur during all phases of mine operation.

2.5. Reclamation

Both alternatives would result in the eventual grading of the pit walls to a 2:1 slope and re-establishment of a native vegetation cover on all disturbed areas. Specific measures are included in the permit for Alternative A. Measures for Alternative B would include those proposed by the operator in the Plan of Operations, plus additional measures required by the NPS. Specific mitigation measures related to reclamation are listed in Tables 2.1 through 2.3. The following summarizes the main features of the reclamation plans for each alternative.

Alternative A (No Action) – Topsoil would be stockpiled and saved for redistribution over the disturbed area. This topsoil, plus any supplemental topsoil needed for adequate coverage, would be placed across the disturbed area to a depth adequate for the establishment and continued existence of the native vegetative communities found in the local area. The current permit requires a depth of 6 inches. The site would be seeded for 2 consecutive years after topsoil placement. Seed specifications would adhere to NPS recommendations and would be reviewed and approved by the Superintendent. The operator must monitor and control exotic species and noxious weeds between both seedings and for 2 years after the final seeding. Reclamation activities must commence no later than 6 months following the conclusion of mining and be completed within 2 years of commencement.

Alternative B (Proposed Action) – Reclamation procedures would generally follow the same as those listed for Alternative A, but with some additional requirements to ensure that the final appearance of the site blends into the surrounding landscape. The slopes would be graded to achieve an overall slope of 2:1, but the slopes would be steepened or flattened randomly and intermittently to simulate the irregularity of the existing terrain. This would leave irregular ledges, shelves, and plenty of pockets suitable for placement of additional topsoil and vegetation or for use as erosion control drainages. The topsoil or fill would be adjusted to obtain a varying contoured slope, and the top and toe of fill would be rounded to blend with surrounding

landforms. Sufficient topsoil would be placed so as to allow re-establishment of a native vegetation community on all disturbed areas to fulfill resource protection goals. Erosion control measures and drainage management will control site drainage and ensure that off-site water quality is not compromised. The park staff would approve all erosion control.

Revegetation would consist of reseeding for two complete years, using a native seed mixture approved by the NPS. Planting of sagebrush may be required at certain locations along the slope. The operator must monitor and control exotic species and noxious weeds between both seedings and for two years after the final seeding. Reclamation activities must commence no later than 6 months following the conclusion of mining and be completed within 2 years of commencement. All reclamation work would be monitored by park staff to ensure that the work conforms to the reclamation plan. All final reclamation design and procedures will be approved by the Superintendent.

2.6. Mitigation

Mitigation under Alternative A consists of the provisions in the Special Use Permit issued in 2000. These are summarized in Table 2.1. Mitigation for Alternative B would include provisions included in the Plan of Operations submitted by the operator and additional mitigation stipulated as a condition of approval by the NPS or other entities. Mitigation for Alternative B is summarized in Tables 2.2 and 2.3. Table 2.2 lists the mitigation as specified by the operator and as specifically described in the operator's submittals to date, and Table 2.3 lists NPS-required or other agency-required mitigation.

**Table 2.1 – Alternative A - Mitigation Measures
(Per the Existing Special Use Permit #IMR-CURE-5300-001)**

Number	Actions	Mitigation Measures under Alternative A, No Action	Reference
1	Drilling/Blasting	Transportation, use, and storage of explosives must comply with all federal, state, and local requirements.	Permit Provision No. 13
2	Crushing	Crusher shall not remain on site for more than 90 days unless approved in writing by the Superintendent.	Permit Provision No. 10
3	Hauling Materials	All vehicle traffic will be confined to existing roads and access roads.	Permit Provision No. 14
4	Waste Disposal	All wastes will be disposed of promptly at an approved location outside the National Recreation Area.	Permit Provision No. 16
5	Waste Disposal	No burning of wastes is permitted.	Permit Provision No. 16
6	Waste Disposal	Chemical toilets or other self-containing sanitation facilities are required.	Permit Provision No. 16
7	Waste Disposal	Any fuel or other contaminating substance spilled must be cleaned up.	Permit Provision No. 16
8	Waste Disposal	Superintendent must be notified of any spill exceeding 20 gallons.	Permit Provision No. 16
9	Chemical use	Use of pesticides is prohibited unless approved in writing by the Superintendent.	Permit Provision No. 17
10	Visitor safety	Signage must be posted at access road gate during operations to prevent unauthorized entry by park visitors.	Permit Provision No. 18
11	Erosion and Sedimentation Control	All sediment control structures must be inspected and maintained regularly.	Permit Provision No. 20
12	Erosion and Sedimentation Control	The Superintendent can require modifications or additions of sediment control structures if needed.	Permit Provision No. 20

Number	Actions	Mitigation Measures under Alternative A, No Action	Reference
13	Erosion and Sedimentation Control	All access and haul roads will be constructed and maintained in a manner that controls and minimizes erosion.	Permit Provision No. 14
14	Erosion and Sedimentation Control	If natural drainage patterns are intersected, these will be contoured to flow in bedrock or riprapped to minimize or avoid erosion.	Permit Provision No. 21
15	Cultural Resource Protection	All reasonable precautions must be taken to protect and preserve cultural and paleontological resources encountered during operations. If any are encountered, work must be stopped immediately and the Superintendent notified.	Permit Provision No. 15
16	Cultural Resource Protection	Cost of salvage will be borne by the permittee.	Permit Provision No. 15
17	Reclamation	Clearing of vegetation and surface disturbance will be minimized and carried out per the Plan of Operations.	Permit Provision No. 21
18	Reclamation	All topsoil shall be stockpiled and saved for redistribution over the disturbed area.	Permit Provision No. 21
19	Reclamation	Topsoil will be redistributed to a depth of 6 inches over the disturbed area and supplemented with suitable growth medium if salvaged topsoil is less than the required volume.	Permit provision No. 21
20	Reclamation	All surfaces will be scarified prior to distribution of topsoil or growth medium.	Permit Provision No. 21
21	Reclamation	The Superintendent must be notified at least 7 days prior to topsoil removal or distribution operations.	Permit Provision No. 21
22	Reclamation	Seed will be applied for 2 consecutive years after topsoil placement.	Permit Provision No. 21
23	Reclamation	Seed mix, application rate, application method, timing of application, and soil amendments will be approved by the Superintendent.	Permit Provision No. 21
24	Reclamation	Exotic species and noxious weeds will be monitored and controlled for 2 years after seeding. Methods of control will be approved by the Superintendent.	Permit Provision No. 21

**Table 2.2 – Alternative B - Operator-Specified Mitigation Measures
(Per the Submitted Permit Application/Plan of Operations dated 2/17/03 and 5/26/03)**

Number	Actions	Mitigation Measures under Alternative B, Proposed Action	Reference
1	Drilling/Blasting	All blasting will be done by licensed contractors with all required permits.	2/17/03 Submittal No. 10
2	Drilling/Blasting	Flaggers with appropriate signage will block traffic during blasting.	5/26/03 Submittal p. 2
3	Drilling/Blasting	Long term storage of explosives is not anticipated.	2/17/03 Submittal No. 13
4	Crushing	Crushing will be limited to 90 days at a set.	2/17/03 Submittal No. 10
5	Erosion and Sedimentation Control	Berms, ditches, and sediment basins including existing sediment control structures will be used for stormwater management; stone dams will be constructed in drainage ditches.	2/17/03 Submittal No. 11 and 5/26/03 Submittal Exhibit B
6	Erosion and Sedimentation Control	If aggregate washing equipment is used, settling structures will be permitted by the Colorado Department of Natural Resources.	2/17/03 Submittal No. 13

Number	Actions	Mitigation Measures under Alternative B, Proposed Action	Reference
7	Erosion and Sedimentation Control	The existing sediment control structure will be used and modified as necessary by the operator as the floor of the pit expands.	5/26/03 Submittal Exhibit A
8	Chemical Use	There will be no fuel storage except mobile temporary tanks and service trucks with less than 110-gallon capacity.	2/17/03 Submittal No. 11, and 5/26/03 Submittal
9	Waste Disposal	Spills will be contained with crusher fines and taken to the Gunnison County Landfill.	2/17/03 Submittal No. 11
10	Waste Disposal	The Superintendent will be notified of any spill exceeding 20 gallons.	2/17/03 Submittal No. 11
11	Waste Disposal	Loaders will quickly berm any spills originating from ruptures.	5/26/03 Submittal p. 3
12	Waste Disposal	All structures and scrap will be removed prior to final reclamation.	2/17/03 submittal No. 15
13	Waste Disposal	All oil changes will be caught in drain pans and used in the waste oil heater in the shop off site.	5/26/03 Submittal p. 3
14	Air Pollution control	Dust control will be done by use of water trucks, storage tank, two small sump pumps, and spray bars on the cone crusher and stacking conveyors. If dusty conditions occur, pumps and spray bars will be used to mist equipment.	2/17/03 Submittal No. 11 and 5/27/03 Submittal p. 3
15	Reclamation	All topsoil shall be stockpiled and saved for redistribution over the disturbed areas.	2/17/03 Submittal No. 5
16	Reclamation	Slopes will be graded 2:1 to minimize erosion and allow for vegetation growth.	2/17/03 Submittal No. 5
17	Reclamation	Seed mix and application rates will be specified by the Colorado Department of Minerals and Geology (would also be approved by the NPS)..	2/17/03 Submittal No. 5
18	Reclamation	Floor area will be scarified and covered as necessary where it would improve the surface for vegetation.	2/17/03 Submittal No. 5
19	Reclamation	Site will be monitored for 2 years by the Colorado Division of Minerals and Geology and the NPS.	2/17/03 Submittal No. 5
20	Visual Impacts	A buffer will be left along the highway to minimize changes to the view from the highway.	2/17/03 Submittal No. 14
21	Visual Impacts	During reclamation, available soil will be placed first on the areas visible from the highway.	2/17/03 Submittal No. 15

Table 2.3 – Alternative B - Additional Mitigation Measures Stipulated as Conditions of Approval by NPS, And Other Mitigation Required by Other Entities

Number	Actions	Mitigation Measures under Alternative B, Proposed Action
1	Archeological Resource Protection	All requirements of the Archeological Data Recovery Plan will be met and all recovery completed within a specified unit prior to any mining surface disturbance within that unit. NPS will retain ownership of any recovered artifacts.
2	Reclamation	Clearing of vegetation and surface disturbance will be minimized and carried out per the Plan of Operations. The site would be graded to an overall 2:1 slope, but with contouring done to create a varying and undulating slope that will blend with the surrounding landscape.

Number	Actions	Mitigation Measures under Alternative B, Proposed Action
3	Reclamation	Topsoil will be redistributed to a depth adequate for the establishment and continued existence of the native vegetative communities found in the local area over the disturbed area and supplemented with suitable growth medium if salvaged topsoil is less than the required volume. Suitable erosion control structures will be incorporated as necessary. The supplemented growth medium and all final reclamation design and procedures will be approved by the Superintendent.
4	Reclamation	The Superintendent must be notified at least 7 days prior to clearance of vegetation, topsoil removal or distribution operations.
5	Reclamation	Seed will be applied for 2 consecutive years after topsoil placement. Planting of sagebrush may be required in some areas along the slope. Seed mix, application rate, application method, timing of application, and soil amendments will be approved by the Superintendent.
6	Reclamation	Exotic species and noxious weeds will be monitored and controlled during mining operations and for 2 years after seeding. The Superintendent will approve methods of control.
7	Noise Control	The operator will comply with all state and local noise regulations.
8	Air Pollution Control	The operator will comply with all state air quality regulations and permitting requirements.
9	Water Pollution Control	The operator will comply with all state water quality regulations and permitting requirements.
10	Monitoring	Reasonable access will be provided to the site for monitoring during and after operations.
11	Hazardous Materials Storage	All hazardous materials and petroleum products will be stored so as to prevent leaks or releases. Containers will be in good condition, with no leaks or areas of rust or corrosion and will be stored away from stormwater drainage ditches, with adequate containment.

2.7. Performance Bond

Approving the Plan of Operations would be conditioned upon the operator tendering a performance/reclamation bond or other suitable instrument. NPS regulations authorize the park Superintendent to require a bond for operations approved under a Special Use Permit. Specifically, 36 CFR § 1.6(e) authorizes park superintendents to “include in a special use permit the terms and conditions that the superintendent deems necessary to protect park resources or public safety and may also include terms and conditions established pursuant to the authority of any other section of this chapter.” Bonding is an established and necessary way to protect NPS resources and is a required condition of approval for mining claim operations (36 CFR § 9.13) and nonfederal oil and gas operations (36 CFR § 9.48). Likewise, NPS Director’s Order #53, *Special Park Uses*, authorizes the NPS to require adequate bonding.

A bond is a measure of insurance that the permittee will comply with permit conditions and that the park will be reimbursed for damage to resources and/or facilities that occurs as a result of the permittee’s actions, both during operations (performance) and after completion of operations (reclamation). If the operator does not satisfactorily correct unauthorized damage to NPS resources that occurs during the operation or does not carry out all required reclamation, the NPS may collect on the bond and apply those monies to pay for the necessary work.

The bond will be in an amount equal to the estimated liability for damage to NPS resources resulting from the operator’s failure to comply with the plan of operations, and to the direct (e.g., structure removal, high wall reduction, final grading, topsoil handling, and revegetation) and indirect costs (e.g., engineering design, mobilization, contingencies, and reclamation management) of reclamation upon completion of operations. The bond amount will be

calculated using information contained in the plan of operations, NPS reclamation standards, State of Colorado standards, and construction/equipment productivity information. The bond may be a full-cost bond (maximum reclamation cost tendered up-front), or it may be tendered in a phased schedule commensurate with the phasing of the operation. A phased-bond is more appropriate for long term operations such as the proposed expansion.

The current 12.4-acre permitted operation at the Dickerson Pit is bonded for \$43,719 and is held by the State of Colorado Division of Minerals and Geology. At this time, the NPS estimates that the bond for the full 31.94-acre expansion may be in the range of \$100,000 to \$150,000. The NPS would work closely with the State of Colorado Division of Minerals and Geology to calculate the new bond upon the completion of the environmental compliance process.

The NPS may be the obligee (the party to whom performance or payment is owed) on the bond, or it may accept evidence of an adequate bond held by another agency (in this case, the State of Colorado Division of Minerals and Geology). If the new bond is held by the State, the NPS and the State would develop a written agreement that requires NPS concurrence prior to release of the bond.

If the operator proposes, and the NPS approves, modifications to the Special Use Permit and operations in the future, the NPS may adjust the amount of the bond to conform to the modifications in the permit. At no time will the NPS allow the estimated performance and reclamation liability to exceed the bond amount.

The NPS will regularly review the bond or other instrument to ensure continued adequate coverage of costs in the event that the operator fails to redress unauthorized damage to NPS resources during the operation or to carry out reclamation. The NPS will also regularly review the surety to ensure continued viability and acceptability.

2.8. Monitoring the Operation

Approval of the Plan of Operations will be conditioned upon the park Superintendent having reasonable access to the site as necessary to properly monitor and ensure compliance with the Plan of Operations. The authority for such access is established for other types of mineral operations in park units, specifically 36 CFR § 9.10(h) and 36 CFR § 9.37(f), and will be expressly included in the Special Use Permit for the operation at the Dickerson Pit.

The Special Use Permit will also specify that the violation of a term or condition in the permit may result in the suspension or revocation of the permit, as authorized by 36 CFR § 1.6(h). The permit will explain that upon the detection of a violation, the park will notify the operator and give the operator 10 calendar days in which to cure the violation. If the operator has neither cured the violation nor taken substantial steps to cure the violation within 10 days of the notification, the park will work with the Department of the Interior Office of the Solicitor to take steps to bring the operation back into compliance, issue a suspension, or revoke the permit. The Special Use Permit will also specify that the bond may not be the operator's complete limit of liability for damages associated with its operation. As authorized by 36 CFR § 9.51(a), the operator will be held liable for additional damages to NPS-owned or controlled lands, waters, or resources, resulting from the failure to comply with the plan of operations and Special Use Permit.

In addition to the remedies available to the NPS under the regulations, an operator is also subject to the remedial provisions found in applicable federal, state, and local laws. For instance, under 16 U.S.C. §19jj, commonly known as the "Park System Resource Protection Act," any person who without authorization destroys, causes the loss of, or injures any National

Park System resource is strictly liable to the United States for response costs and for damages resulting from such destruction, loss or injury.

2.9. Alternatives Considered but Dismissed from Further Analysis

During the scoping process for this project, two alternatives were considered to reduce impacts of the proposed expansion. These alternatives were discussed in consultation with the NPS park staff, Regional Support Office, and Washington Support Office for technical guidance. For the reasons described below, these alternatives were not subjected to further analysis.

NPS Acquisition of the Mineral Rights that are Part of Gunnison Gravel's Proposal

The NPS has examined the possibility of acquiring the Dickerson's mineral estate, but with severe budget reductions, funding is not available to purchase the mineral estate in the foreseeable future. Nevertheless, should the opportunity ever arise to purchase the Dickerson's mineral estate, the acquisition would be a categorical exclusion under 3.4(C)(1) of DO-12, "Land acquisition within established park boundaries, if future anticipated uses would have no potential for environmental impact."

Sale or Donation of Land to Adjoining Governmental Agency

One public commentor asked if the pit could be sold or donated to an adjacent governmental land management agency, such as the Bureau of Land Management (BLM) or Colorado Division of Wildlife (CDOW), whose lands border the site on the north and west, respectively. Neither of these agencies has expressed any interest in acquiring the site. In addition, the site's operations would not be compatible with wildlife use on CDOW property. Although the operation might be more compatible with BLM land use plans for this area, the operation would still be located at the park entrance and adjacent to park property, so a land ownership transfer would not eliminate the visual or noise impacts to park visitors from pit operations. For these reasons, this alternative was not further considered.

2.10. Environmentally Preferred Alternative

Section 101 of NEPA states that "...it is the continuing responsibility of the Federal Government to...(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which would permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources" [42 U.S.C. §4321 *et seq.* §101 (b)].

The environmentally preferred alternative is based on these national environmental policy goals. Under Alternative A, No Action, the expansion would not occur. Because there would be no new impacts from what would occur under the existing permit (a limit of 12.4 acres), Alternative A would provide the greatest protection of area and park resources and values. Alternative A meets five of the six criteria (1 through 4, and 6) and is therefore the environmentally preferred alternative.

The Proposed Action, Alternative B, would have greater effects on the environment because of the additional disturbance of 19.5 acres. Alternative B, with all mitigation, meets four of the six criteria (1, 2, 4, and 5). Although mitigating measures would reduce effects to park resources and values, there would still be some undesirable consequences due to the mining of an additional 19.5 acres of previously undisturbed land. Therefore, this alternative would not meet national environmental policy goals as well as the No Action Alternative would, and therefore is not the environmentally preferred alternative.

2.11. NPS Preferred Alternative

Although Alternative A is the environmentally preferable alternative, it would deny the mineral reservation owners the reasonable exercise of their remaining mineral rights, and possibly lead to litigation. Thus, the NPS preferred alternative is Alternative B, Proposed Action with mitigation. The NPS believes this alternative would fulfill its mandates and direction, giving due consideration to environmental, economic, technical, and other factors. Table 2.4 outlines both alternatives and how well each alternative meets the objectives of this project. The actions required for this project and to what extent park resources are impacted are summarized in Tables 2.5 and 2.6.

Table 2.4 – Extent that Each Alternative Meets Identified Objectives

Objectives	Does Alternative A, No Action, Meet Objective?	Does Alternative B, Proposed Action, Meet Objective?
Provide holders of private mineral rights reasonable access for development, to the extent it does not compromise the purposes of Curecanti National Recreation Area or conflict with the mission and mandates of the National Park System.	No (-) The expansion would not occur, precluding the owner/operator from reasonable access to develop his/her nonfederal mineral interests.	Yes (+) The expansion would be permitted, with the application of mitigation measures to meet other objectives.
Analyze potential impacts to cultural resources on or eligible for listing on the National Register of Historic Places as well as natural and socioeconomic resources.	Yes (++) The impacts to these resources are fully analyzed in the EA.	Yes (++) The impacts to these resources are fully analyzed in the EA.
Develop measures to avoid, minimize, or mitigate adverse impacts to park resources and values, human health and safety, and visitor use and experience; and to prevent impairment to park resources and values.	Yes (++) The lack of expansion would result in avoidance of the archeological sites and would limit impacts to other resources.	Yes (+) Mitigation measures would avoid and minimize impacts.
Involve the public in the environmental process.	Yes (++) Public involvement was completed as part of the EA process, including notices and distribution of a newsletter. The document will be made available for public review and comment.	Yes (++) Public involvement was completed as part of the EA process, including notices and distribution of a newsletter. The document will be made available for public review and comment.

Table 2.5 – Comparative Summary of Alternatives

Actions	Alternative A, No Action	Alternative B, Proposed Action
Areas of New Disturbance	Remainder of 12.4 permitted acres.	Additional 19.5 acres (33.16 acres in mineral estate, but 1.22 acres preserved as a visual buffer).
Proposed Start Date	Ongoing.	June 2004 (estimated).
Proposed End Date	One to three years from present.	42 years from present.
Hours of Operation	Daylight only.	Same as Alternative A.
Days of Operation	Mining – March 1 to December 31 Processing – usually April 1 to December 31	Same as Alternative A.
Drilling and Blasting	Approximately one to two times per year. Duration 1 to 2 weeks No long term storage of explosives. Explosives not stored on site.	Approximately one to two times per year or more, depending on demand. Duration 1 to 2 weeks. No long term storage of explosives. Explosives not stored on site.
Crushing and Screening	Contract crusher on site. 250 tons per hour, 90 days duration.	Same as Alternative A.
Other Equipment	Truck scales (mobile), portable van trailer, wheel loaders, 25- to 65-ton bulldozers, trackhoes, shovels, motorgrader conveyors, stackers, trucks, scrapers.	Same as Alternative A, plus portable asphalt plant or concrete plant up to 90 days operation; possible aggregate washing equipment – would require permitted settling structure.
Hauling Off-site-Truck Traffic	Current average one to two trucks per day; maximum could be up to 120 trucks per day during busiest summer days.	Expected average of less than 40 trucks per day, but with maximum of up to 120 trucks per day on busiest summer days (one truck every 6 minutes).
Erosion/Sedimentation Control	Current berms, ditches, sediment basins at trees near scales and east of scales; drain ditch has catch structures of crushed rock designed to slow water and drop sediments.	Same as Alternative A, plus existing structures will be modified as necessary by the operator as the floor of the pit expands.
Fuel and Oil Use/Storage	For on-site equipment – fuels and oils stored in temporary mobile tanks only. No permanent fuel storage. Service trucks carry tanks less than 110 gallons. All spills to be contained and cleaned up.	Same as Alternative A, plus storage of oils and fuels must be done in a manner that prevents leaks or releases.
Dust Control	Water truck, storage tank, sump pumps, and spray bars on crusher and conveyors. Crusher has emission controls and air quality permit.	Same as Alternative A.

Actions	Alternative A, No Action	Alternative B, Proposed Action
Reclamation	Topsoil would be stockpiled and saved for redistribution over the disturbed area. This topsoil, plus any supplemental topsoil needed for adequate coverage, would be placed across the disturbed area to a depth adequate for the establishment and continued existence of the native vegetative communities found in the local area. The current permit requires a depth of 6 inches. The site would be seeded for 2 consecutive years after topsoil placement. Seed specifications would adhere to NPS recommendations and would be reviewed and approved by the Superintendent. The operator must monitor and control exotic species and noxious weeds between both seedings and for 2 years after the final seeding. Reclamation activities must commence no later than 6 months following the conclusion of mining and be completed within 2 years of commencement.	Same as Alternative A, plus the slopes would be graded to achieve an overall slope of 2:1, but the slopes would be steepened or flattened randomly and intermittently to simulate the irregularity of the existing terrain. The topsoil or fill would be adjusted to obtain a varying contoured slope, and the top and toe of fill would be rounded to blend with surrounding landforms. Sufficient topsoil would be placed so as to allow reestablishment of a native vegetation community on all disturbed areas to fulfill resource protection goals. Revegetation would consist of reseeded for two complete years, using a native seed mixture approved by the NPS. Planting of sagebrush may be required at certain locations along the slope. The operator must monitor and control exotic species and noxious weeds between both seedings and for two years after the final seeding. Reclamation activities must commence no later than 6 months following the conclusion of mining and be completed within 2 years of commencement. All reclamation work would be monitored by park staff to ensure that the work conforms to the reclamation plan. All final reclamation design and procedures will be approved by the Superintendent.

Table 2.6 – Comparative Summary of Impacts

Impact Topic	Alternative A, No Action	Alternative B, Proposed Action
Nonfederal Mineral Development	This alternative results in a long term, negligible to minor, adverse impact on local/regional mineral supplies. There could be a cumulative, minor, long term adverse impact on mineral supplies.	This alternative would result in a minor beneficial impact on county mineral supplies. Cumulative impacts to local/regional mineral supplies would be long term, minor, and beneficial .
Air Quality	Continuing operations at the Dickerson Pit would result in localized, mostly intermittent or short term, negligible to minor, adverse impacts on air quality within the analysis area. Cumulative impacts from the existing mineral operation at the Dickerson Pit; routine park operations; park, commercial, and recreational vehicle uses; and other land uses outside the park are expected to result in short term, negligible to minor, adverse impacts on air quality throughout the park, and air quality would remain within state and federal standards. No impairment to air quality would result from implementation of this alternative.	Additional blasting and crushing at the pit, as well as increased truck traffic associated with the expansion, would result in localized, short to long term, negligible to minor, adverse impacts on air quality within the analysis area. Cumulative impacts would be similar to those described under Alternative A, with short term, negligible to minor, adverse impacts on air quality throughout the park, and air quality would remain within state and federal standards. No impairment to air quality would result from implementation of this alternative.

Impact Topic	Alternative A, No Action	Alternative B, Proposed Action
Geology and Soils	Current operations at the pit such as blasting, heavy equipment operation, vehicle traffic, and the possibility of leaks or spills of hydrocarbon products used on-site, would result in localized, long term, negligible to minor, adverse impacts on geology and soils within the analysis area. Cumulative impacts from existing mineral development operations in the area, BLM and CDOW owned roads, and visitor uses are expected to result in short to long term, negligible to minor adverse impacts, localized near developments throughout the park. No impairment to geology and soils would result from implementation of this alternative.	This alternative would result in localized, long term, moderate adverse impacts on geology and soil. Cumulative impacts would be similar to those described under Alternative A, No Action, with localized short to long term, minor, adverse impacts on geology and soil throughout the park. No impairment to geology and soil would result from implementation of this alternative.
Water Quality	Adverse impacts to water quality would be mitigated through the use of existing stormwater control features, and the limited operations remaining at the quarry would result in negligible to minor, mostly short term adverse impacts to water quality in the Gunnison River, and no adverse impacts to water quality in Beaver Creek. Cumulative adverse impacts to water quality would be both short and long term, and minor . No impairment to water quality would result from implementation of this alternative.	This alternative would have minor, adverse impacts to water quality, which would occur infrequently but over the long term until reclamation is completed. Cumulative impacts would be similar to those described under Alternative A, with short to long term, minor adverse impacts to water quality. No impairment to water quality would result from implementation of this alternative.
Vegetation	The removal of the remaining undisturbed area within the current permit boundary and the continued use of the pit would result in direct, short and long term, negligible to moderate adverse impacts to vegetation over a small area of the site. Cumulative impacts to vegetation would be adverse, minor, and short to long term, and generally localized around developments. No impairment to vegetation would result from implementation of this alternative.	Overall impacts to vegetation would be localized, negligible to moderate, short to long term, and adverse . Cumulative impacts would be greater than those described under Alternative A, with short to long term, minor to moderate, direct and indirect, adverse impacts, generally localized around developments. No impairment to vegetation would result from implementation of this alternative.

Impact Topic	Alternative A, No Action	Alternative B, Proposed Action
Wildlife	The removal of the remaining undisturbed area and continued operations at the pit would result in short term, negligible to minor, adverse impacts to wildlife. Cumulative impacts to wildlife would be short and long term, negligible to minor, and adverse, generally localized around areas of high use or development. No impairment to wildlife would result from implementation of this alternative.	Impacts to wildlife would be greater than those described under Alternative A, occurring over a larger area, over a substantially longer time frame, and at a higher intensity at times resulting in more indirect noise effects and direct impacts to wildlife inhabiting the area that would be removed. Impacts would not affect wildlife at the population level, although individuals may be displaced. Impacts to wildlife would therefore be localized, long-term, minor, and adverse impacts . Cumulative impacts would be minor to moderate, adverse, and both short and long term, generally localized around areas of high use or development. No impairment to wildlife would result from implementation of this alternative.
Species of Management Concern	There would be no adverse impacts to any federally listed species of management concern, since none are known to inhabit that area, and state-listed species would incur no effect to negligible adverse short term impacts from operational noise. Cumulative impacts to listed species would be long term, negligible to minor, and adverse . No impairment to any listed species would result from the implementation of the alternative.	There would be no adverse impacts to any federally listed species of management concern, since none are known to inhabit that area. State-listed animal species would incur minor effects from noise that could be above background levels in adjacent areas where these species may roost or pass by. Two state-listed plants would be affected, but because they are common in this area and seeds will be collected, adverse impacts would be considered moderate . Cumulative impacts to species of management concern would be considered adverse, negligible to moderate and long term . No impairment to any listed species would result from the implementation of this alternative.
Archeological Resources	Under Alternative A, there would be no direct adverse impacts to archeological resources by completing the mining at the pit. There would be a continued cumulative loss of unknown intensity of archeological resources from the ongoing natural and user-related impacts. No impairment to any archeological resource would result from the implementation of this alternative.	Under Alternative B, there would be a direct adverse effect to archeological Site 5GN1277. The effect would be treated and minimized through data recovery and is thereby considered a moderate adverse impact . There would be continued cumulative loss of unknown intensity of archeological resources from the ongoing natural and user-related impacts. No impairment to any archeological resource would result from the implementation of this alternative.

Impact Topic	Alternative A, No Action	Alternative B, Proposed Action
Visitor Use and Experience	<p>Visual impacts from the continued pit operations and eventual reclamation of the site would be long term, negligible to minor, and adverse. Activities on the site would result in short term, negligible to minor, adverse impacts related to noise and general disturbance to visitors. Cumulative impacts on visitor use and experience throughout the park are expected to be localized near developments or activities, with short to long term, minor to moderate, adverse impacts.</p>	<p>Existing impacts on visitor use and experience within the analysis area would be similar to Alternative A, but over an extended time period and at more intense levels at times. Noise impacts from pit operations would be localized, short to long term, negligible to moderate, and adverse. Visual impacts from the pit would be long term, minor to moderate, and adverse. Impacts to recreation use in the vicinity of the pit would be negligible to minor. Cumulative impacts on visitor use and experience throughout the park would be expected to be localized near developments or activities, with short to long term, minor to moderate, adverse impacts.</p>

3.0. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Methodology

This section describes the existing environment that would be affected by the proposed action and the direct, indirect, and cumulative impacts under the two alternatives. Impacts are described in terms of context, duration, and intensity.

- The context or extent of the impact may be **localized** (affecting the immediate project area) or **widespread** (affecting other areas of the park and/or the region); the context may be specifically described in the impact topic.
- The duration of impacts could be **short term**, ranging from days to approximately 3 years in duration, or **long term**, extending up to 20 years or longer.
- The intensity and type of impact is described as **negligible**, **minor**, **moderate**, or **major**, and as **beneficial** or **adverse**. Where the intensity of an impact can be described quantitatively, the numerical data are presented. However, most impact analyses are qualitative.

Cumulative Impacts

The CEQ regulations, which implement the NEPA (42 U.S.C. 4321 *et seq.*), require 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). The following descriptions of park development and operations, and adjacent land uses and land use permitting provide the basis for analyzing cumulative impacts in this EA. These descriptions should be used in conjunction with the description of the affected environment for nonfederal mineral development that follows in Section 3.1.

Park Development and Operations

Congress enacted the Colorado River Storage Project Act to, among other things, conserve the scenery, natural, historic, and archeological resources and wildlife in what is now Curecanti National Recreation Area. The park staff continues to conduct research and planning related to these purposes. There is an ongoing Resource Protection Study that is focused on assessing area resources to recommend alternatives for protection of resource value and character. The Dickerson Pit site has not been specifically addressed in the study. The outcome of the study will provide recommendations for park boundaries and protection of the resources of the park. Also, in some cases, the park has purchased land to protect scenic viewsheds. The BOR, which manages the reservoir and related facilities, is an important partner in the ongoing studies. The BOR does not have any specific policies regarding the operation of the pit (Schroeder 2004).

Adjacent Land Uses and Land Use Planning

The BLM and CDOW, respectively, own the lands immediately to the north and west of the Dickerson Pit. The lands in the project area managed by the BLM include one mineral pit, the McCabe Pit, a small community pit located between the park and Gunnison. There are no specific plans for the BLM lands surrounding the Dickerson Pit (Tollefson 2004). The CDOW lands are being managed for wildlife use and include a Watchable Wildlife viewing area that is close to pit operations. People using the parking area will be able to see the pit and may

experience some visual impacts from the operation; however, the pit operations are not expected to impact the wildlife using the area such that viewing would be precluded or greatly disrupted in the area around the parking area (Oulton 2004). There are no plans to change the use of the area.

CDOT continues to perform upgrades to area highways and roads, including US 50, which passes through the park and is the access point for the pit. Traffic on US 50 and other area roads contribute to impacts to resources and visitors, especially from traffic noise. The traffic on US 50 is dependent on many factors, including park visitation, and would likely be heaviest on weekends and holidays and in the summer months. In 2002, the average annual daily traffic along US 50 from Gunnison to State Highway (SH) 149 was 6,104 vehicles. CDOT also is a primary customer for road base materials, which could affect the demand for mineral materials from the pit.

Development with the surrounding county also affects resources in the area. Recreational and residential development on such lands has become an issue during the past several years (NPS 1999). Thus far, the major issues include the proposed Blue Mesa Highlands Development, proposed residential development on McIntyre Gulch, construction/operation of Blue Mesa Recreational Ranch, ongoing construction of a residential development, and local and external mineral exploration and development. All of these issues are linked to increases in construction, runoff, and disposal of human wastes and thus, loss of aesthetic qualities and potential effects on the natural system (NPS 1999). However, Gunnison County recently passed a Land Use Resolution (Gunnison County 2001) that contains numerous requirements for mineral extraction and new development within the county. This may influence the rate at which additional development proceeds in the county, including new mines.

Organization of the Analysis

The impact analyses are organized by impact topic. Under each impact topic, the affected environment is described, methodology is described including impact threshold definitions, impacts under each alternative are given, a cumulative impact analysis is provided (analysis area is parkwide), and a conclusion is stated. The conclusion section summarizes all major findings, including whether or not an impairment of resources or values is likely or would occur. Impairment analyses are only performed for park resources and values (including all natural and cultural resources). See Section 1.2.3 *The Non-impairment Mandate*, for a description of impairment.

3.1. Impacts on Nonfederal Mineral Development

Methodology

Impacts on nonfederal mineral development were analyzed by reviewing current mining operations at the Dickerson Pit and researching information on other mining in the vicinity of the pit. Information from the park's enabling legislation, current local, state and federal laws and regulations, and the park's approved General Management Plan were also reviewed.

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

Negligible: The impact is barely measurable and/or would not affect local or regional supplies of mineral materials.

- Minor:** The impact is slight but measurable and/or would affect local or regional supplies of mineral materials.
- Moderate:** The impact is readily apparent and/or would affect local or regional supplies of mineral materials.
- Major:** The impact is severely adverse or exceptionally beneficial and/or would affect local or regional supplies of mineral materials.

The geographic area of analysis for impacts to nonfederal mineral development was defined as the park and the surrounding area within 50 miles of the park where other mineral materials sites are located.

Affected Environment

Mineral production in Colorado is mainly used for road base and coverings, concrete and asphalt, and fill material. The state of Colorado produced almost 62.5 million tons of aggregate in 2002 and ranked 8th in the nation for sand and gravel production (Colorado Geologic Survey 2003). Colorado sand and gravel average \$4.79 per ton, while crushed rock averages \$5.90 per ton. The largest sand and gravel operation in the state is Lafarge Corporation. The largest producers in Gunnison County are Valco Gunnison Concrete and American Concrete and Gravel. These companies cover most of the demand in the county, which is between 600,000 and 800,000 tons per year. There are approximately 30 smaller operations within the county. The Dickerson Pit, under its current Special Use Permit, produces approximately 10,000 to 15,000 tons per year, approximately 2 percent of the demand within the county. The current Special Use Permit will allow only 1 to 3 years more production.

The Dickerson Pit currently produces six products:

- ¾-inch Road Base (\$7.25/ton fob Pit) – popular for gravel roads
- 3/8-inch Chips unsorted (\$16.00/ton fob Pit) – road material sealed with asphalt
- 3/8-inch Chips sorted (\$22.00/ton fob Pit) – road material sealed with asphalt
- 1-½-inch Chips (\$12.50/ton) – road material
- 1-½-inch Road Base (\$7.25/ton) – road base
- Shot-rock (\$25/ton) – stream containment
- Pit run (produced without processing)

Competition for projects is dependent on product specifications, rapid availability, and delivered price. Once a site is permitted with sufficient reserves to give flexibility to project size, a pit can be competitive.

Impacts of Alternative A, No Action, on Nonfederal Mineral Development

Under Alternative A, No Action, the Dickerson Pit would not expand beyond the current limit of 12.4 acres. However, the pit represents only about 2 percent of the total county demand for mineral materials. Therefore, the loss of this production would result in negligible to minor, long term, adverse impacts to local and regional nonfederal mineral development.

Cumulative Impacts

Under Alternative A, No Action, other mineral material sites in the area would continue to produce; others may cease operations and new sites may be permitted. However, based on the county's new land use resolution, the permitting of new sites may be influenced in the future.

Also, demand for the material will likely fluctuate, but would be expected to continue, at least at current levels, due to expected road construction and improvements in the area. There could be a cumulative, long term minor adverse impact on local/regional nonfederal mineral development from all activities expected under alternative A.

Conclusion

Under Alternative A, No Action, the Dickerson Pit would not expand beyond the current limit of 12.4 acres, resulting in a long term, negligible to minor, adverse impact on local/regional mineral supplies. There could be a cumulative, minor, long term adverse impact on mineral supplies.

Impacts of Alternative B, Proposed Action, on Nonfederal Mineral Development

Under Alternative B, Proposed Action, the Dickerson Pit would expand to its full mineral right of 33.16 acres (with 1.22 acres reserved as a visual buffer), which could result in a minor beneficial impact on county mineral supplies. The proposed expansion would increase the Dickerson Pit contribution to the county mineral supplies from 2 percent to approximately 10 percent.

Cumulative Impacts

Under Alternative B, Proposed Action, the Dickerson pit could produce between 31,000 and 85,000 tons per year. Since mineral demand is expected to remain at least at its current level, the additional supply from the Dickerson Pit would be beneficial to the county mineral supply. Therefore, the cumulative impact on nonfederal mineral development in the county and surrounding region would be long term, minor, and beneficial.

Conclusion

Under Alternative B, Proposed Action, the full expansion of the Dickerson Pit would result in a minor beneficial impact on county mineral supplies. Cumulative impacts to local/regional mineral supplies would be long term, minor, and beneficial.

3.2. Impacts on Air Quality

Methodology

Impacts on air quality were analyzed by reviewing current state and federal laws regarding air quality and the park's approved General Management Plan. Information about regional air quality was obtained from the Colorado Department of Public Health and Environment (CDPHE) and previously completed environmental compliance documents for the park.

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

- Negligible:** No changes would occur or changes in air quality would be below or at the level of detection, and if detected, would have effects that would be considered slight and short term.
- Minor:** Changes in air quality would be measurable, although the changes would be small, short term, and the effects would be localized. No air quality mitigation measures would be necessary.
- Moderate:** Changes in air quality would be measurable and have consequences, although the effect would be relatively local. Air quality mitigation measures would be necessary, and the measures would likely be successful.

Major: Changes in air quality would be measurable, have substantial consequences, and be noticed regionally. Air quality mitigation measures would be necessary, and the success of the measures could not be guaranteed.

The geographic area of analysis for impacts to air quality was defined as the airshed in the immediate area of the project site.

Affected Environment

The park is in a sparsely populated area on the western slope of the Rocky Mountains and is within the Western Slope Region for air quality planning (CDPHE 2003a). The park is classified as a Class II air quality area, an area in which some degradation is allowed. Low population levels and lack of large industries have meant high standards of air quality and good visibility on a year-round basis. High winds occasionally generate dust storms in the park when the reservoir is low (NPS 1997). The Air Quality Control Commission of the CDPHE is responsible for monitoring and evaluating air quality in the state. The CDPHE has adopted the federal National Ambient Air Quality Standards (NAAQS) except for sulfur dioxide (SO₂). Current standards are set for SO₂, carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter equal to or less than 10 microns in size (PM₁₀), fine particulate matter equal to or less than 2.5 microns in size (PM_{2.5}), and lead (Pb). These pollutants are collectively referred to as criteria pollutants.

Areas are classified under the federal Clean Air Act as either “attainment” or “nonattainment” areas for each criteria pollutant based on whether the NAAQS have been achieved or not. When an area has been designated as an attainment area after having been nonattainment, it is also classified as a maintenance area. Colorado has experienced a decline in air pollutants over the past 15 to 20 years. In 1995, Colorado had 12 areas of nonattainment; today there are no areas of nonattainment. However, areas of concern in Colorado are ozone levels in the Denver metropolitan area and PM₁₀ and PM_{2.5} levels in mountain communities (CDPHE 2003a).

The nearest air quality monitoring station is in Gunnison, 8 miles east of Curecanti. The CDPHE operates PM₁₀ monitoring sites in Gunnison, Delta, Crested Butte, and Mt. Crested Butte. In the past few years, there have also been PM₁₀ monitoring sites in Montrose, Olathe, Paonia, and Hotchkiss. CO, PM₁₀, and PM_{2.5} are also monitored at a site in Grand Junction. EPA operates an ozone monitor at Gothic, near Crested Butte. No exceedances of any NAAQS were reported for these stations in 2001-2002, according to a Report to the Public prepared by the Air Pollution Control Division of the CDPHE and published by the Colorado Air Quality Control Commission in October 2002. Data from the National Air Quality and Emissions Trend Report (EPA 2003) indicate that PM₁₀ levels in Gunnison County are in the normal range for the state (CDPHE 2003b). Air quality standards are shown in Table 3.1.

Table 3.1 – National Ambient Air Quality Standards

Pollutant	NAAQS ^a			Colorado ^b
	Average Type	Primary ^c	Secondary ^d	Concentration
Carbon Monoxide (CO)	8-hour	9.0 ppm (10 mg/m ³)	--	9.0 ppm (10 mg/m ³)
	1-hour	35 ppm (40 mg/m ³)		35 ppm (40 mg/m ³)
Lead (Pb)	Calendar Quarter	1.5 µg/m ³	Same as primary standard	--
Nitrogen Dioxide (NO ₂)	Annual Average	0.053 ppm (100 µg/m ³)	Same as primary standard	0.053 ppm (100 µg/m ³)
Ozone (O ₃)	1-hour	0.12 ppm (235 µg/m ³)	Same as primary standard	0.12 ppm (235 µg/m ³)

Pollutant	NAAQS ^a			Colorado ^b
	Average Type	Primary ^c	Secondary ^d	Concentration
	8-hour	0.08 ppm (157 µg/m ³)	Same as primary standard	--
PM ₁₀	Annual Arithmetic Mean	50 µg/m ³	Same as primary standard	50 µg/m ³
	24-hour	150 µg/m ³	Same as primary standard	150 µg/m ³
Fine Particulate Matter (PM _{2.5})	Annual Arithmetic Mean	15 µg/m ³	Same as primary standard	--
	24-hour	65 µg/m ³	Same as primary standard	--
Sulfur Dioxide (SO ₂)	Average Annual	0.03 ppm (80 µg/m ³)	--	See Note e
	24-hour	0.14 ppm	--	
	3-Hour	--	1,300 µg/m ³	

Source: EPA 2003, CDPHE 2002a

- National Ambient Air Quality Standards (other than O₃, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year.
- Colorado Ambient Air Quality Standards (other than annual averages) are not to be exceeded more than once per year.
- National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
- National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of pollution.
- The Colorado SO₂ standard contains more detail than can be easily displayed in this table. SO₂ is not a pollutant of interest for this Environmental Assessment, and therefore, the detail is not included.

Impacts of Alternative A, No Action, on Air Quality

Under Alternative A, No Action, the Dickerson Pit would not expand. Impacts on air quality in the analysis area would continue as the result of current mining operations at the pit, which are expected to last for another 1 to 3 years. Current operations at the pit that would contribute to emissions of particulate matter are blasting, crushing, screening, vehicle traffic, and reclamation grading. Particulate matter emissions would be greatest during crushing operations. Particulate matter emissions would be controlled through the use of water trucks, a water storage tank, two small sump pumps, and spray bars on the cone crusher and stacking conveyors. The operation of combustion engines, used on the crushers, conveyors, and trucks, would produce increased emission levels of nitrogen oxide, carbon monoxide, carbon dioxide, and SO₂, which would quickly dissipate as the air moves off site.

The operator and/or the contractor operating the equipment would comply with all state air quality regulations and permitting requirements. The possibility exists for leaks or spills of hydrocarbon products used on site. Spilled hydrocarbon products could volatilize and enter the atmosphere. With the mitigation measures and prompt response in the event of a spill, these impacts could be localized, with minor, intermittent/short term adverse impacts on air quality. Therefore, with mitigation, the continuing mining operations at the Dickerson Pit would result in localized, mostly intermittent/short term, negligible to minor, adverse impacts on air quality within the analysis area.

Cumulative Impacts

Under Alternative A, cumulative impacts on air quality throughout the park could result from the continuing operation of the nonfederal mineral operation within the park combined with other activities that could contribute to air quality impacts in the area of analyses. These include routine maintenance of park roads; park, commercial, and recreational vehicle use; and public recreational activities such as motor boating. Natural and prescribed fires would also add to air pollution. Activities outside the park that would contribute to impacts on air quality include

various land development projects, road building and maintenance, vehicle emissions, and fires. As a result of these activities, cumulative impacts on air quality in the park are expected to be mostly short term, because emissions would be readily dissipated by prevailing winds, and range from negligible to minor adverse impacts. Air quality would be expected to stay within state and federal standards.

Conclusion

Under Alternative A, No Action, the Dickerson Pit would not expand. Continuing operations at the Dickerson Pit would result in localized, mostly intermittent or short term, negligible to minor, adverse impacts on air quality within the analysis area. Cumulative impacts from the existing mineral operation at the Dickerson Pit; routine park operations; park, commercial, and recreational vehicle uses; and other land uses outside the park are expected to result in short term, negligible to minor, adverse impacts on air quality throughout the park, and air quality would remain within state and federal standards. No impairment to air quality would result from implementation of this alternative.

Impacts of Alternative B, Proposed Action, on Air Quality

Under Alternative B, Proposed Action, the Dickerson Pit would expand 19.5 acres to its full mineral right of 33.16 acres, minus 1.22 acres reserved as a visual buffer. The expansion of the pit would have the same types of emissions as under Alternative A, including particulate matter from activities such as blasting, crushing, screening, vehicle traffic, and reclamation grading; operation of combustion engines; use of the conveyors and trucks; and potential leaks or spills of hydrocarbon products used on site. This expansion would result in localized and short term increases in particulate matter during ground-disturbing activities such as blasting and crushing and increased truck traffic during hauling operations. Mitigation measures to control dust and other emissions would be required and applied, as described in Tables 2.2 and 2.3. Prevailing winds would be expected to dissipate emissions quickly out of the area. However, the duration of mining operations, approximately 42 years, and the increase in yearly production, would result in localized short and long term, negligible to minor adverse impacts on air quality.

Cumulative Impacts

Under Alternative B, Proposed Action, cumulative impacts on air quality would be similar to those described under Alternative A. Outside of the mining operation, other activities that could contribute to air quality impacts include routine maintenance of park roads; park, commercial, and recreational vehicle use; and public recreational activities such as motor boating. Natural and prescribed fires would also add to air pollution. Activities outside that park that would contribute to impacts on air quality include various land development projects, road building and maintenance, vehicle emissions, and fires. As a result of these activities, cumulative impacts on air quality in the park are expected to be mostly short term, because emissions would be readily dissipated by prevailing winds, and range from negligible to minor adverse impacts. Air quality would be expected to stay within state and federal standards.

Conclusion

Under Alternative B, Proposed Action, the Dickerson Pit would be allowed to expand, resulting in disturbance to an additional 19.5 acres. Additional blasting and crushing at the pit, as well as increased truck traffic associated with the expansion, would result in localized, short to long term, negligible to minor, adverse impacts on air quality within the analysis area. Cumulative impacts would be similar to those described under Alternative A, with short term, negligible to minor, adverse impacts on air quality throughout the park, and air quality would remain within state and federal standards. No impairment to air quality would result from implementation of this alternative.

3.3. Impacts on Geology and Soils

Methodology

Impacts on geology and soils were analyzed by reviewing information on geological resources in the park obtained from NPS geologists who were involved in internal scoping.

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

- Negligible:** An action that could result in a change to geology and soils, but the change would be so small that it would not be of any measurable or perceptible consequence.
- Minor:** An action that could result in a change to geology and soils, but the change would be small and of little consequence.
- Moderate:** An action that could result in a noticeable change to geology and soils; the change would be measurable and of consequence. Reclamation to offset these impacts would likely be successful.
- Major:** An action that would result in a noticeable change to geology and soils; the change would be measurable and result in a severely adverse or major beneficial impact. The success of reclamation to offset these impacts cannot be guaranteed.

The area of analysis for impacts to geological resources is defined as the pit area, north of the pit to the runoff drainage, south to the bottom of the slope, east to US 50, and west to the toe of the slope down to Beaver Creek.

Affected Environment

The Gunnison area lies in a transition zone between two physiographic provinces: the southern Rocky Mountains to the east and the Colorado Plateau to the west. In addition, it lies between two Tertiary volcanic centers: the West Elk Mountains to the north and the San Juan Mountains to the south (Hansen 1965).

The area of the Dickerson Pit composed mostly of Granite. Over time the Granite has been subject to erosion and the rocks have undergone an extremely long and complex period of deformation. The effects of the erosion and deformation have been the creation of the material to be mined at the pit, decomposed granite.

Notwithstanding the geologic complexity of the site, the 1963 deed used the terms “decomposed granite and the materials intermixed therewith” to describe the materials which were to be included in the Dickerson family’s mineral reservation. Presently, the extent of the “decomposed granite” and “intermixed materials” remaining at the site is unknown, since we cannot see below the surface of the ground, and since sampling would not necessarily yield an accurate picture of this jumbled deposit. Continued monitoring of the operation would be necessary to ensure that only the reserved materials are being mined and removed. (Figure 3.1).



Figure 3.1 – Site Geology – Decomposed Granite and Intermixed Material

According to the U.S. Department of Agriculture (1975), soil types in the project area consist of Duffson Series (Spring Creek Stony Loams) and Stony Rock Land. The Duffson Series (Spring Creek Stony Loams) is characterized as being well-drained, shallow stony soil with a moderate to high erosion hazard. Stony Rock Land is characterized by exposed bedrock, loose stones, boulders and soils that are very shallow, with a high content of loose stones, over bedrock.

Impacts of Alternative A, No Action, on Geology and Soils

Under Alternative A, No Action, the Dickerson Pit would not expand beyond the current 12.4-acre limit. Impacts on geology and soils in the analysis area would continue until the operator has reached the 12.4-acre limit. Current operations at the pit that contribute to impacts on geology and soil are blasting, heavy equipment operation, vehicle traffic, and the possibility of leaks or spills of hydrocarbon products used on site.

Blasting and removal of the mineral material would result in direct, localized, long term, adverse impacts to both geology and soil, but is an unavoidable impact, given the nature of the operation. Vehicles used during mining operations and for removal would compact the soil. These vehicles could drip or leak motor oil, coolant, and other lubricants. The intensity of impacts would be variable, depending on the number of vehicles entering the pit on a given day. Impacts would be highest during the summer months when extraction is the highest.

Mitigation of impacts would be accomplished with sediment control structures (including berms, ditches, and sediment basins), maintaining access and haul roads to limit erosion, and

maintaining natural drainage patterns. Therefore, with mitigation, existing uses, including vehicle traffic, blasting, and heavy equipment placement, would result in localized, long term, negligible to minor, adverse impacts on geology and soils within the analysis area.

At the conclusion of mining, a reclamation plan would be followed to rehabilitate the disturbed area. This plan would include stockpiling of topsoil to redistribute over the disturbed areas, seeding of topsoil for 2 consecutive years, and monitoring and controlling noxious weeds. Reestablishment of vegetation would reduce the loss of soil through wind and water erosion.

Cumulative Impacts

Under Alternative A, No Action, cumulative impacts on geology and soil throughout the park could result from continued visitor use in the area and on the BLM and CDOW lands, which could continue to compact soil or cause increased erosion and soil loss. Vehicle traffic on unimproved roads would contribute to soil compaction in the area. Other mineral mining operations in the area would remove soil and geologic material. Leaks and spills from vehicles along US 50 and on dirt roads on BLM and CDOW lands could result in localized, minor impacts on geology and soil. Cumulative impacts on geology and soils throughout the park are expected to be localized near developments, with short to long term, negligible to minor, adverse impacts.

Conclusion

Under Alternative A, No Action, the Dickerson Pit would not expand. Current operations at the pit such as blasting, heavy equipment operation, vehicle traffic, and the possibility of leaks or spills of hydrocarbon products used on-site, would result in localized, long term, negligible to minor, adverse impacts on geology and soils within the analysis area. Cumulative impacts from existing mineral development operations in the area, BLM and CDOW owned roads, and visitor uses are expected to result in short to long term, negligible to minor adverse impacts, localized near developments throughout the park. No impairment to geology and soils would result from implementation of this alternative.

Impacts of Alternative B, Proposed Action, on Geology and Soils

Under Alternative B, Proposed Action, the Dickerson Pit would expand to its full mineral right of 33.16 acres, minus the 1.22 acres reserved as a visual buffer. Impacts on geology and soil within the analysis area would be greater than Alternative A, No Action, with localized, long term, moderate, adverse impacts associated with vehicle use, heavy equipment placement blasting, reclamation grading, the possibility of leaks or spills of hydrocarbon products used on site, and potential long term loss of soil productivity due to steepened slopes following reclamation.

Mitigation measures to protect soil would include those under Alternative A, plus the construction of additional sediment control basins as the floor of the pit enlarges. These measures would be designed to limit erosion during the period of mining activity. Following the completion of mining activities, the site would be reclaimed to limit erosion. The site would be graded to a 2:1 slope, with occasional changes in slope to mirror the natural surroundings, the floor area would be scarified and covered as necessary where it would improve the surface for vegetation growth, and the site would be monitored for 2 years by the Colorado Division of Minerals and Geology and NPS. All other reclamation outlined for Alternative A would also apply to Alternative B. The potential for leaks and spills exists during all phases of mineral development operations, resulting in impacts that could have severe, but localized effects on geology and soils; however, with the mitigation measures included with this alternative, the intensity of impacts would be reduced. With mitigation, the Dickerson Pit expansion would result in localized, long term, moderate adverse impacts on geology and soil.

Cumulative Impacts

Under Alternative B, Proposed Action, cumulative impacts on geology and soils throughout the park would be similar to those described under Alternative A, with impacts from existing mineral development operations in the area, on BLM- and CDOW-owned roads, and visitor uses, resulting in short to long term, minor adverse impacts, generally localized near developments.

Conclusion

Under Alternative B, Proposed Action, the Dickerson Pit would expand, resulting in the long term disturbance to geology and soil on up to 19.5 additional acres. With mitigation, the Dickerson Pit expansion would result in localized, long term, moderate adverse impacts on geology and soil. Cumulative impacts would be similar to those described under Alternative A, No Action, with localized short to long term, minor, adverse impacts on geology and soil throughout the park. No impairment to geology and soil would result from implementation of this alternative.

3.4. Impacts on Water Quality

Methodology

Impacts on water quality were analyzed by reviewing park and site-specific water quality information, in conjunction with personal site observations and professional judgment.

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

- Negligible:** An action that would not affect water quality or hydrology, or changes would be either not-calculable or would have effects that would be considered slight, local, and short term.
- Minor:** An action that could result in calculable changes in water quality or hydrology, although the changes would be small, most likely short term, and the effects would be localized. Any mitigation measures associated with water quality or hydrology that would be necessary would likely be successful.
- Moderate:** An action that could result in measurable long term changes in water quality or hydrology, but the changes would be relatively local. Mitigation measures associated with water quality or hydrology would be necessary and the measures would likely be successful.
- Major:** An action that would result in measurable changes in water quality or hydrology, would have substantial consequences, and would be noticed on a regional scale. Mitigation measures would be necessary and their success would not be guaranteed.

The area of analysis for impacts to water quality is defined as the pit area, north of the pit to the runoff drainage, south and east to the Gunnison River, and west to North Beaver Creek.

Affected Environment

Although there are no surface water bodies or streams on the quarry site itself, the Gunnison River and Beaver Creek are nearby, and both are located downslope from the mining operations. The Gunnison River is located east and south of the pit, with the closest portion lying approximately 400 feet from the lower portion of the pit floor, to the east across U.S.

Highway 50. (see Figure 3.5). Designated uses of the river include aquatic life (Class 1), recreation (Class 1a), water supply, and agriculture (CDPHE, 2004). The existing water quality as defined by the Colorado Department of Public Health and Environment, (CDPHE, 2000) is better than the numeric standards for this stream segment (Malick, pers. comm.).

Surface water runoff from current operations eventually enters the Gunnison River, but it is managed by use of berms, ditches, and sediment basins, with catch structures in the ditches. These stormwater control features were designed to slow water and drop sediments prior to the runoff leaving the site and entering drainage ditches that eventually lead to the river. The mine currently operates under a CDPS discharge permit, which protects the existing water quality of the river, and there have been no reports of violations of the permit conditions.

North Beaver Creek is a tributary of the Gunnison River and is approximately 500 feet west and downslope of the undisturbed portion of the site (see Figure 3.5). The majority of it is located on Colorado Division of Wildlife land but a small portion of the lower section flows through NPS property and it eventually flows south beneath U.S. Highway 50 to join the Gunnison River. The creek is surrounded by a relatively heavy vegetated riparian zone (see Figure 3.3). North Beaver Creek is also designated for aquatic life (Class 1), water supply, and agricultural uses, but is classified as a Recreation Class 2 segment with a Recreation 1a numeric standard. Primary contact recreation probably does take place in this segment, however, the current use classification/numeric standard are the result of a compromise with basin water interests,. As with the Gunnison River, the existing water quality as defined by the Colorado Department of Public Health and Environment, (CDPHE, 2000) is better than the numeric standards for this stream segment (Malick, pers. comm.)

Both the Gunnison River and North Beaver Creek are considered Reviewable Waters according to the State of Colorado. Any proposed regulated activity that is likely to result in new or increased water quality impacts to these waters must be evaluated to determine whether the degradation is necessary to accommodate important economic or social development. Antidegradation parameters are currently being collected on both rivers including nitrate, unionized ammonia, dissolved cadmium, dissolved copper, dissolved lead, dissolved manganese, dissolved selenium, dissolved silver, dissolved zinc, oxygen, pH, and E. coli.

Impacts of Alternative A, No Action, on Water Quality

Under Alternative A, No Action, the pit would not be expanded, but mining would continue for 1 to 3 years in the currently permitted area. Because the western portion of the site would not be disturbed, no impacts to water quality in the Beaver Creek drainage would be expected. Adverse impacts to the Gunnison River would be limited because of the stormwater management structures and controls already in place at the pit. Stormwater runoff would continue to leave the site in ditches that parallel the access road, which lead to other ditches that eventually lead to the river; however, most excess sediment would remain behind in the control ponds and catch structures. Also, any spills or releases of fuels or oils are to be immediately cleaned up per current permit conditions, and no fuels are allowed to be permanently stored on site, which limits the opportunity for larger spills or releases. Therefore, any water leaving the site should be relatively free of sediment or other pollutants, and the type of mining operation adds no toxic metals to the runoff. Adverse impacts to the water quality of the Gunnison River would therefore be negligible to minor, and mostly sporadic or short term in nature, occurring during heavier storm events.

Cumulative Impacts

Other actions within and outside the park affect water quality in the Gunnison River in the vicinity of the quarry and its tributaries such as Beaver Creek. These include the any upstream uses that have permitted discharges to the river, discharges from various construction sites, runoff from any disturbed grounds or paved areas or agricultural uses, and even waste disposal from humans or animal waste. However, water quality in both the Gunnison River and Beaver Creek is considered good to excellent, as both have quality better than their designated standards. Therefore, the cumulative impacts of other actions in the park and in upstream areas, added to the minimal adverse effects under Alternative A, would result in both short and long term minor, direct and indirect adverse impacts to water quality in the area of analysis.

Conclusion

Under Alternative A, the Dickerson Pit would not expand. Adverse impacts to water quality would be mitigated through the use of existing stormwater control features, and the limited operations remaining at the quarry would result in negligible to minor, mostly short term adverse impacts to water quality in the Gunnison River, and no adverse impacts to water quality in Beaver Creek. Cumulative adverse impacts to water quality would be both short and long – term, and minor. No impairment to water quality would result from implementation of this alternative.

Impacts of Alternative B, Proposed Action, on Water Quality

Under Alternative B, the Dickerson Pit would be expanded, and an additional 19.5 acres would be mined, with removal of all native vegetation and soils over the entire site, although in phases. This includes the area that lies just uphill from the Beaver Creek drainage. There would be a resultant increase in stormwater runoff that would be directed to the east toward the Gunnison River within the existing drainage ditches, and a potential for runoff to flow downhill toward Beaver Creek when the western portion of the site is mined. However, the proposed Plan of Operations includes many stormwater control measures, including use of settling ponds designed to limit downstream sedimentation and the resultant decline in water quality that could occur if sediments were to reach the downstream waters. Also, the NPS would require erosion control measures, such as silt fences, to limit loss of soil and downgradient sedimentation. Similar to Alternative A, the NPS would require rapid cleanup of any spills or releases and would not allow permanent storage of fuels or oils on site. In addition, the NPS would require good housekeeping practices regarding storage of lubricants, oils, or fuels, so that containers are stored in good condition and with adequate containment.

At the conclusion of mining, the site would be reclaimed. The reclamation plan would require the establishment of a native vegetation cover and installation of approved erosion control or drainage ditches, which would greatly limit loss of soil or excessive runoff into neighboring water bodies. Monitoring would be done to ensure that these controls are working and are adequate.

With implementation of these required mitigation measures, adverse impacts to water quality in both Beaver Creek and Gunnison River from the implementation of Alternative B would be minor and limited to the area in the immediate vicinity of the pit, with most impacts occurring sporadically during severe storm events. Because the reclamation of the site would not occur until after all mining is completed, which may take up to 42 years, impacts would continue over the long term.

Cumulative Impacts

Under Alternative B, cumulative impacts to water quality would be slightly greater than those described under Alternative A, since the expansion of mining at the site would result in more surface runoff to off-site water bodies. However, the stormwater control measures and

reclamation required as part of Alternative B would reduce the duration and intensity of these impacts. Overall, the impacts of other actions in the park and in upstream surrounding areas, in conjunction with the mining and reclamation under Alternative B, would result in both short and long term minor adverse impacts to water quality in the area of analysis.

Conclusion

Under Alternative B, Proposed Action, the Dickerson Pit would expand, resulting in disturbance of an additional 19.5 acres and subsequent increase in surface runoff. However, stormwater and erosion control measures that are included in the Plan of Operations or required by the NPS, and eventual reclamation of the site, would limit off-site impacts to water quality to minor levels, which would occur infrequently but over the long term until reclamation is completed. Cumulative impacts would be similar to those described under Alternative A, with short to long term, minor adverse impacts to water quality. No impairment to water quality would result from implementation of this alternative.

3.5. Impacts on Vegetation

Methodology

Impacts on vegetation were analyzed by reviewing park and site-specific vegetation information in conjunction with personal site observations and professional judgment.

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

- Negligible:** An action that could result in a change in an individual vegetative species or community, but the change would be so small that it would not be of any measurable or perceptible consequence.
- Minor:** An action that could result in a change in an individual vegetative species or community, but the change would be small and of little consequence.
- Moderate:** An action that could result in a change in an individual vegetative species or community. The change would be measurable and of consequence to the species or community.
- Major:** An action that would have a noticeable change in an individual vegetative species or community. The change would be measurable and result in a severely adverse or major beneficial impact, or possible permanent consequence, upon the vegetation species or community.

The geographic area of analysis for impacts to vegetation includes the pit, the runoff drainage, south to the bottom of the slope, east to US 50, and west to the toe of the slope down to Beaver Creek.

Affected Environment

Vegetation on the site and surrounding lands varies, ranging from bare ground where the pit has been mined (Figure 3.2) to more dense brush and woodland on the neighboring property leading down to Beaver Creek on the west (Figure 3.3). On the undisturbed portion of the project site, vegetation consists mainly of a sagebrush-dominated community with associated native grasses and forbs (Figure 3.4). Topsoil is thin and rocky, and there is no source of water on the site other than precipitation. Therefore, existing vegetation is sparse. The aerial photo provided as Figure 3.5 provides a view of the existing vegetation cover of the pit site and neighboring properties.



Figure 3.2 – Pit Operational Area



Figure 3.3. Adjacent Division of Wildlife Property



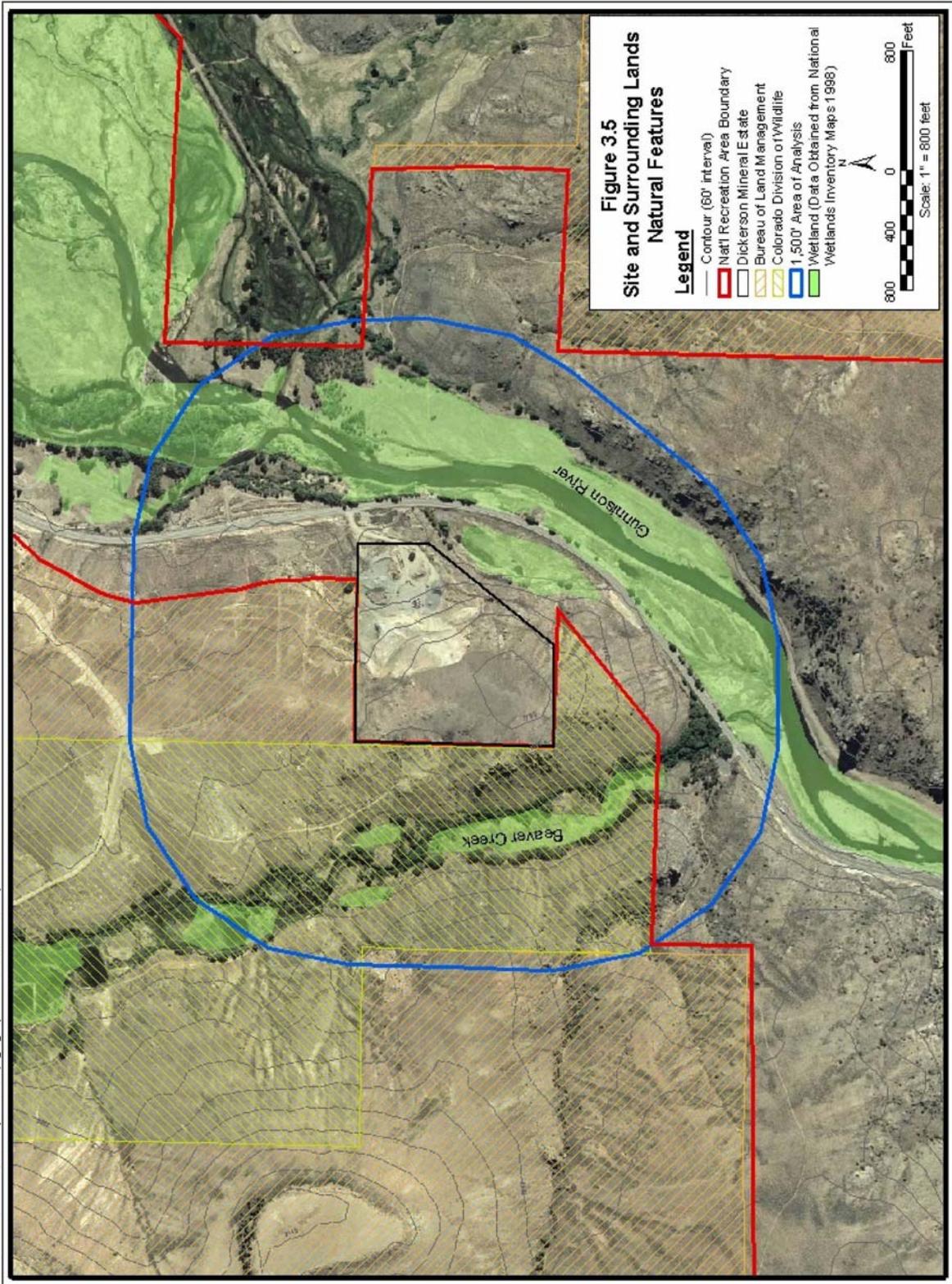
Figure 3.4. Sagebrush Community on Top of Site (Looking West)

A detailed vegetation survey of the site was completed on July 10, 2003 by park biologists. A complete list of the species found is provided in Appendix A. The survey results indicate that Wyoming big sagebrush dominates the majority of the shrub communities on the site, with small pockets of Rocky Mountain juniper, Utah serviceberry, and wax currant. Dominant grasses are blue grama, Sandberg bluegrass, and needle-and-thread grass. Muttongrass and other needlegrasses are more minor components. There was one patch of galleta grass observed. Gunnison milkvetch (*Astragalus anisus*), a rare species endemic to Gunnison and Saguache counties, was found only on rocky soil already disturbed by mining activities and on undisturbed soils on the eastern slope of the property. Rollin's twinpod (*Physaria rollinsii*), which is also listed by the State Heritage Program, was also found on the site. See Species of Management Concern for more discussion of these species.

Neighboring lands have more varied vegetation cover. The area to the west leading downslope to Beaver Creek includes denser shrub and woodland cover (Figure 3.3). A narrow belt of shrub and emergent wetland vegetation borders Beaver Creek, but these wetlands are at least 500 feet away from the site boundary and would not be disturbed by any proposed actions on the site. Other areas surrounding the pit include rocky, sparsely vegetated hillsides, additional sagebrush-dominated communities to the north, and a small pond/wetland area that is located to the southeast of the site, along US 50.

Impacts of Alternative A, No Action, on Vegetation

Under Alternative A, No Action, the pit would not be expanded, resulting in no new impacts on vegetation on any property beyond what is currently permitted for mining. However, impacts on vegetation in the analysis area would result from the continued operation of the pit to its permitted limits and the subsequent required reclamation efforts.



Under Alternative A, the remaining portion of the 12.4 acre area covered by the 2000 NPS Special Use Permit would be mined, resulting in a total loss of the existing native vegetation community on the 12.4 acres. However, reclamation per the requirements of the current permit would eventually restore a native vegetation cover to the newly disturbed area and the other portions of the pit that have already been stripped and mined. The reclaimed areas would be covered with the stockpiled soils and seeded with native grasses. Eventually sagebrush and other native grasses and forbs would become established on the site. With mitigation, Alternative A would result in localized, minor to moderate, adverse impacts on vegetation.

Direct and indirect impacts on vegetation could occur as a result of the introduction of exotic vegetation resulting from the placement of fill material during reclamation, non native seeds entering the project area from adjacent lands, or seeds carried in on construction equipment. However, with the mitigation measures included with this alternative, the potential, duration, and intensity of impacts would be reduced to minor adverse levels.

The remaining mining activity and reclamation of the site could also indirectly affect vegetation on neighboring lands, due to deposition of dust from processing of the minerals, and earthmoving during mining and grading of the site in preparation for seeding. This would likely be blown or washed off the affected vegetation, and adverse impacts would be localized, short term, and negligible.

The potential for leaks and spills exists during all phases of mining operations, resulting in impacts that could have severe, but localized effects on vegetation. However, with the mitigation measures included with this alternative, the intensity of impacts would be reduced. Mitigation measures include requirements to contain and clean up all spills and to limit the amount of fuel on site to what is needed. No permanent fuel tanks would be located on the site. With the application of these measures, spills should be quickly contained and removed, resulting in negligible to minor short term, adverse impacts to localized areas of the site.

Cumulative Impacts

Other projects within the park have affected vegetation and will potentially affect vegetation in the future. These include maintenance of roads and structures, trampling of vegetation by park visitors and other users, and development of previously vegetated areas for parking facilities and other visitor use areas. However, sagebrush-dominated communities are relatively common throughout the park and the region, and any projects done under park supervision would require mitigation and reclamation of disturbed areas. Also, the Resource Protection Study underway in the park will identify vegetation communities that merit protection and help to limit development or disturbance in these areas, and vegetation would continue to be protected on nearby CDOW and BLM property. Overall, the cumulative impacts of other actions in the park, added to the adverse effects and benefits expected under Alternative A, would result in short and long term minor, direct and indirect adverse impacts to vegetation, generally localized around developments.

Conclusion

Under Alternative A, the Dickerson Pit would not expand. The removal of the remaining undisturbed area within the current permit boundary would be mitigated by site reclamation. The site disturbance, plus the potential for effects from the continued use of the pit, would result in short term and intermittent, negligible to moderate adverse impacts to vegetation over a small area of the site. Cumulative impacts to vegetation would be adverse, minor, and short to long term, and generally localized around developments. No impairment to vegetation would result from implementation of this alternative.

Impacts of Alternative B, Proposed Action, on Vegetation

Under Alternative B, the Dickerson Pit would be expanded, and an additional 19.5 acres would be mined, with removal of all native vegetation for the mined area. Reclamation after the end of mining would involve grading the site to a 2:1 slope, adding some change in topography to simulate the surrounding landscape, seeding with native grasses endemic to the region, and possibly planting sagebrush in some areas. The 2:1 slope has been shown to support successful revegetation in the area (Stahlnecker, pers. comm.), and it is expected that the site will eventually support a healthy vegetation cover. The vegetation removal expected under Alternative B would result in long term, moderate, but localized, adverse impacts to vegetation. However, because the reclamation of the site would not occur until after all mining is completed, which may take up to 42 years, this would be a long term adverse impact.

Direct and indirect impacts on vegetation could occur as a result of the introduction of exotic vegetation resulting from the placement of fill material, non-native seeds entering the project area from adjacent lands, or seeds carried in on construction equipment. However, with the mitigation measures included with this alternative, including revegetation, the potential and intensity of impacts would be reduced.

The potential for leaks and spills exists during all phases of mining operations, resulting in impacts that could have severe, but localized effects on vegetation. With the extended operations under Alternative B, this potential would exist for a longer time and over a larger area. However, with the mitigation measures included with this alternative, the intensity of impacts would be reduced. Mitigation measures include requirements to contain and cleanup all spills, and to limit the amount of fuel onsite to what is needed. No permanent fuel tanks would be located on the site. With the application of these measures, spills should be quickly contained and removed, resulting in negligible to minor short term, adverse impacts to localized areas of the site.

Cumulative Impacts

Under Alternative B, cumulative impacts to vegetation would be greater than those described under Alternative A, with the expansion of mining at the site from 12.4 to 31.94 acres adding to direct cumulative adverse impacts. However, the reclamation required as part of Alternative B would reduce the duration and intensity of these impacts and all actions under Alternative B would result in short to long term, negligible to moderate, adverse impacts to vegetation. Overall, the impacts of other actions in the park, in conjunction with the mining and reclamation under Alternative B, would result in both short and long term minor to moderate adverse impacts to vegetation in the park, generally localized around developments.

Conclusion

Under Alternative B, Proposed Action, the Dickerson Pit would expand, resulting in disturbance of an additional 19.5 acres. Native vegetation cover in this area would be lost and reclamation of the site would eventually restore regionally endemic native vegetation cover to the site; however, this would not occur until after all mining is completed and the impacts would therefore be considered long term. Impacts to vegetation from all actions under Alternative B would be localized, negligible to moderate, short to long term, and adverse. Cumulative impacts would be greater than those described under Alternative A, with short to long term, minor to moderate, direct and indirect, adverse impacts, generally localized around developments. No impairment to vegetation would result from implementation of this alternative.

3.6. Impacts on Wildlife

Methodology

Impacts on wildlife were analyzed by reviewing park plans and previous environmental assessments. Other agencies were contacted (CDOW and BLM), and personal observations by park staff familiar with the site were obtained and included in the analysis.

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

- Negligible:** An action that could result in a change to an individual wildlife species or population, but the change would be so small that it would not be of any measurable or perceptible consequence.
- Minor:** An action that could result in a change to an individual wildlife species or population. The change would be small and of little consequence.
- Moderate:** An action that could result in a change to an individual wildlife species or population. The change would be measurable and of consequence to the species or resource.
- Major:** An action that would have a noticeable change to an individual wildlife species or population. The change would be measurable and result in a severely adverse or major beneficial impact, or possible permanent consequence, upon wildlife individual species or population.

The geographic area of analysis for impacts to wildlife was defined as the pit and a 1,500-foot-radius area surrounding the pit. This was based on attenuation of noise with distance (for example, an 80 to 90 decibel [dB] drill rig reaches background levels of about 40 dB at 1,500 feet [NPS 2001b]).

Affected Environment

Although there are 51 species of mammals and more than 220 species of birds known to inhabit the park (NPS 1999), the quarry site and its immediate surroundings support a much more limited suite of wildlife. The pit itself is of very limited value to wildlife because of the existing disturbance and the continued presence of humans and noise associated with mining operations. The disturbed areas of the site provide little food, cover, or shelter for any species. The undisturbed area of the site is predominantly a sagebrush-dominated community (see Vegetation), which does support a variety of small mammals, birds, and reptiles. However, with the noise and disturbance of the pit so close by, wildlife are likely to avoid the area and the immediately surrounding lands.

Typical wildlife that could be found on the undisturbed portion of the site include small mammals and rodents such as cottontail rabbit, white-tailed jackrabbit, ground squirrels, and mice or voles. Songbirds and raptors such as hawks and eagles may pass over the area, but would be more common in adjacent shrub and woodlands and along the Gunnison River riparian area to the east. Reptiles, such as lizards and snakes, could also be seen on the property. Some wildlife species less frequently found in the area that may be transients in the nearby woodlands include fox, coyote, and porcupines. Mule deer and elk are expected on or near the site, which is in the winter concentration area and severe winter range for both species (Colorado State University 2004). However, the site is close to their "limited use" area because of the disturbance of the pit (Oulton 2004). The Gunnison sage grouse may also be found near the

site in appropriate sagebrush habitat, although none has been observed in the area (see Species of Management Concern for more information on the sage grouse).

Concerns were raised during scoping about potential impacts to species that are not found on the site, but which inhabit areas close to the site that may be affected by noise from operations and traffic. Table 3.3 in the Visitor Use section depicts typical noise levels from various sources, including some of the equipment used at the pit. Noise decreases with distance from the source, generally by 6 dB for each doubling of distance from the source (Stanford University 2004). This means that most noise from the louder equipment used at the pit (such as the crusher, bulldozers, and drilling equipment, which can be at 80 to 90 dB near the source) would decrease to about 40 dB levels at about 1,500 feet from the source. There are no background noise measurements at Curecanti, but based on measurements taken in other parks, it is likely that background levels range from 40 to 50 dB in areas of visitor use and may be higher in areas with more visitors or vehicle/boat noise (see Visitor Use and Experience).

Wildlife can be disturbed by noise, which can cause flushing of birds, startle responses, flight, and general avoidance of the disturbed area. Reactions in wildlife vary by species to individuals (Bowles 1995) and also vary depending on duration, habitat, season, activity occurring at time of disturbance, and the physical condition of the individual (Radle 2004). Of greatest concern are loud noises near nesting or breeding individuals. There is a blue heron colony along the Gunnison River on the park boundary and northeast of the site, approximately 0.5 mile northeast of the mine. A variety of waterfowl use the park rivers and lakes and can be found along the Gunnison River just east of the site. These include the mallard and common merganser, which reside year round and nest along the water (NPS 1999). Other species such as loons, grebes, gulls, terns, cormorants, and sandpipers are seasonal residents; however, none of these would be found close to the site.

The park also provides habitat for a variety of raptors, including hawks, peregrine falcons, and bald eagles (also see Species of Management Concern). Raptors use dead tree snags and prominent rock outcrops throughout the park for perching. There are no snags on or immediately adjacent to the site; however, prominent rock outcrops do exist in the vicinity. No raptor species is known to nest on or near the site. Raptors could pass over the site, and hawks are likely to roost on trees along the Gunnison River. Raptors, hawks, and owls may be found in the more forested lands adjoining the site, particularly the CDOW lands, and noise from site operations could reach these areas.

Impacts of Alternative A, No Action, on Wildlife

Under Alternative A, No Action, the Dickerson Pit would not expand beyond the 12.4 acres currently permitted, and only a small portion of the existing wildlife habitat on the site would be lost. The loss of the additional habitat and the continued use of the pit would result in few impacts to wildlife, since the remaining area to be removed is very small and most wildlife have presumably vacated the immediate vicinity of the site because of the close proximity of current operations. Reclamation of the entire permitted area would restore a native vegetation community on the site (see Vegetation), which may reduce impacts of the operation for some species of wildlife. Direct and adverse impacts to any wildlife species would be negligible to minor, short term, and very localized.

Wildlife that utilize the undisturbed portion of the mineral estate and the neighboring lands would be disturbed by noise from site operations for another 1 to 3 years. Primary sources of loud noise that would carry beyond the site include bulldozers, loaders, trucks, the crusher/screener, and drilling and blasting. Blasting would not be expected to affect many wildlife species except for those in the immediate vicinity of the pit, since it is a very short term and somewhat muffled

effect, as the explosives are detonated within the earth. Noise from other equipment can reach 80 to 100 dB (see Table 3.3 in Visitor Experience). Noise generally decreases by 6 dB for each doubling of distance from the source (Stanford University 2004), so that noise levels from mining operations at distances exceeding 1,500 feet from the site would likely be the same as the expected background noise levels in the park, especially near US 50.

Noise levels in immediately adjacent lands would exceed expected background levels during operation of various equipment at the site, and wildlife in these areas would be expected to be affected. Birds may take temporary flight when vehicles approach too close or there are sudden loud noises, and then land to resume their activity after vehicles have passed. Other animals may also leave the area, although some may become acclimated to the disturbance over time. Displaced wildlife could increase competition in adjacent areas over the short term, resulting in a negligible to minor, adverse impact on the wildlife in the neighboring CDOW and BLM properties.

During scoping, concerns were raised about peregrine falcons, nesting blue herons and waterfowl along the Gunnison River, and the Gunnison sage grouse. The grouse and peregrine falcon are listed species at either the federal or state level and are discussed under Species of Management Concern. Waterfowl along the Gunnison River area within the 1,500-foot buffer (see Figure 3.5) could experience some reaction to noise from pit operations, but the effects would be short term, minor, localized, and limited to effects such as avoidance or temporary movement away from the area. Some birds would become acclimated to the additional pit noise as one part of the background noise in the area, especially highway traffic noise. The closest blue heron colony is far enough away from the pit (approximately 2,500 feet to the northeast) so that pit operations and associated noise would not be expected to have any adverse impacts on the herons.

Some spills may occur during operations; however, there would be no fuels stored permanently on site and the amounts used are small. The operator is required to contain and clean up all spills, so that adverse impacts to wildlife from release of hazardous materials would be negligible.

The continuation of mining for the remainder of the permit under Alternative A would result in localized, short term, negligible to minor, adverse impacts on wildlife within the analysis area.

Cumulative Impacts

Under Alternative A, No Action, cumulative impacts on wildlife throughout the park could result from various park operations that occur within the area of analysis, including construction or maintenance of facilities and prescribed fires, as well as from the highway use and noise, recreational visitor presence, boating, and development of lands adjacent to the park. Wildlife in areas of development would be displaced to nearby habitats, and some large-scale developments could remove habitat or cause incidental take of less mobile species. Some species, such as fox, deer, and squirrel, are susceptible to roadkill along US 50. Operations that occur within the park or on nearby CDOW or BLM property could disturb wildlife habitat, but these would be expected to be done in compliance with NEPA or other regulations and policies that limit wildlife impacts, and reclamation of disturbed lands would be done in most instances, providing long term benefits for wildlife. Overall, impacts of these actions, along with the actions under Alternative A, would result in long term and short term, negligible to minor, direct and indirect adverse impacts to wildlife, generally localized around areas of high use or development.

Conclusion

Under Alternative A, No Action, the Dickerson Pit would not expand. The removal and eventual reclamation of the remaining undisturbed area and continued operations at the pit would result in short term, negligible to minor, direct and indirect adverse impacts to wildlife. Cumulative impacts to wildlife would be adverse, negligible to minor, and short and long term, generally localized around areas of high use or development. No impairment to wildlife would result from implementation of this alternative.

Impacts of Alternative B, Proposed Action, on Wildlife

Under Alternative B, the remaining 19.5 acres of the site would be mined under the approved expansion. Direct impacts to wildlife using the area would occur as the land surface is disturbed and the minerals are removed. Wildlife would flee the noise and disturbance in the immediate vicinity of the operational face of the pit, and incidental take of less mobile wildlife, could occur, but would be minimal. The loss of 19.5 acres of sagebrush habitat would adversely affect individuals of those species that use the area, including deer, elk, rabbits, a variety of songbirds, and possibly an occasional raptor hunting over the sagebrush community. Reclamation of the site would occur, which would establish a native grass community on the site that would eventually support more forbs and shrubs over time. However, this would not be done until all mining is completed, which could take up to 42 years. Therefore, this impact would be considered a long term, localized impact, and of minor intensity, since changes would not affect wildlife at the species population level.

Noise from mining operations would affect wildlife in surrounding areas, as described under Alternative A. However, because of the increase in disturbance and length of operations under Alternative B, these impacts would be long term and more widespread than under Alternative A. Once mining has progressed to the western and northern edges of the site, noise levels in the nearby CDOW and BLM lands would be above expected background levels and be more intense during times of peak operation/demand. Deer, elk, transient coyotes, foxes, songbirds, raptors, and other woodland wildlife that would be found on the CDOW property, and the typical sagebrush community species to the north, would likely respond by either avoiding the area, fleeing into similar adjacent habitat, or for some, becoming somewhat acclimated to a higher level of noise. Impacts would be considered minor to moderate, localized, and long term, since operations would continue for 42 years.

Across US 50, raptors and waterfowl using the Gunnison River and the associated riparian areas could be similarly adversely affected, since noise levels could be above background levels in the quieter areas along the river at times of drilling and crusher or bulldozer operation. Again, impacts would generally include avoidance of the area, flight, or some acclimation. Park biologists have not observed substantial noise effects in the area from existing operations, and the nonlisted species of concern identified during scoping, such as the blue herons, do not nest within the 1,500-foot radius where noise from operations would have effects. Therefore, impacts to wildlife along the Gunnison River from mining noise would be sporadic over the long term, localized, and minor. Impacts to listed species, including peregrine falcon, bald eagle, and Gunnison sage grouse, are discussed in the following section on Species of Management Concern.

Cumulative Impacts

Under Alternative B, Proposed Action, cumulative impacts on wildlife throughout the park would be greater than those described under Alternative A, with additional impacts resulting from the additional removal of 19.5 acres of sagebrush community over a period of up to 42 years. Along with the other action occurring in and around the park that could adversely and beneficially affect wildlife, cumulative impacts to wildlife under Alternative B would be long and

short term, minor to moderate, and adverse, generally localized around areas of high use or development.

Conclusion

Under Alternative B, Proposed Action, the Dickerson Pit would expand, resulting in disturbance of an additional 19.5 acres. Impacts to wildlife would be greater than those described under Alternative A, occurring over a larger area, over a substantially longer time frame, and at a higher intensity at times, resulting in more indirect noise effects and direct impacts to wildlife inhabiting the area that would be removed. Impacts would not affect wildlife at the population level, although individuals may be displaced. Impacts to wildlife would therefore be long-term, minor, and adverse. Cumulative impacts would be minor to moderate, adverse, and both short and long term, generally localized around areas of high use or development. No impairment to wildlife would result from implementation of this alternative.

3.7. Impacts on Species of Management Concern

Methodology

Species of Management Concern are defined for this EA as those listed by either the U.S. Fish and Wildlife Service (USFWS) as endangered, threatened, candidate, or special concern; or by the State of Colorado or the Colorado Natural Heritage Program (CNHP) as endangered, threatened, or a special concern or imperiled species.

For federally listed species, the terms “threatened” and “endangered” describe the official federal status of vulnerable species as defined by the Endangered Species Act of 1973. The term “candidate” is used officially by the USFWS when describing those species for which sufficient information on the biological vulnerability and threats is available to support issuance of a proposed rule to list, but rule issuance is precluded for some reason. Federal “species of concern” are those for which listing may be warranted, but further biological research and field study are needed to clarify their conservation status. In Colorado, CDOW maintains a listing of state endangered, threatened, and special concern animal species, but there is not a state governmental agency that has regulations for rare plants. Instead, the state relies on the CNHP listing of imperiled plant species.

NPS policies dictate that federal candidate species, species of concern, and state-listed threatened, endangered, candidate, or sensitive species be managed as similarly as possible to federally listed threatened or endangered species (NPS 2001C). Therefore, all of these special status species are included in this discussion.

Species of Management Concern were analyzed by gathering information on state and federally protected species that could occur in Curecanti National Resource Area from state and federal permitting agencies, research, personal observation, consultation with park specialists, and reference materials. Consultation with the USFWS was initiated by requesting a list of species for the park (see Appendix B).

The NPS has developed the following threshold definitions under the NEPA guidelines. Each definition corresponds to the USFWS definitions used to assess impacts to federally listed species under the Endangered Species Act. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: No state and/or federally listed species would be affected or the alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any

measurable or perceptible consequence to the protected individual or its population. A negligible effect would equate to a "no effect" determination by the USFWS.

Minor: The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small. A minor effect would equate to "may affect" determination by the USFWS and would be accompanied by a statement of "not likely to adversely affect" the species.

Moderate: An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect could have some long term consequence to the individual, population, or critical habitat. A moderate effect would equate to a "may affect" determination by the USFWS and would be accompanied by a statement of "likely to adversely affect" the species or critical habitat.

Major: An individual or population of a listed species, or its critical habitat, would be noticeably affected with a long term, vital consequence to the individual, population, or habitat. A major effect would equate to a "may affect" determination by the USFWS and would be accompanied by a statement of "likely to adversely affect" the species or critical habitat.

The geographic area of analysis for impacts to Species of Management Concern was defined as the pit and a 1,500-foot-radius area surrounding the pit. This was based on attenuation of noise with distance (an 80 to 90 dB drill rig reaches background levels of about 40 dB at 1,500 feet [NPS 2001b]).

Federally Listed Species

As part of the consultation process for the EA, the park contacted the USFWS regarding federally listed species that could occur within the park. The USFWS response is provided as Appendix B. The species listed by USFWS, their federal status (and state status if applicable), and their potential for occurrence on or near the site are presented on Table 3.2.

**Table 3.2 – Federally Listed Species
That could occur in Curecanti National Recreation Area**

Common Name	Scientific Name	Federal Status	State Status	Present On/Near Site?
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	T	Fly over only
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C	SC	No
Canada lynx	<i>Lynx canadensis</i>	T	E	No
Boreal toad	<i>Bufo boreas boreas</i>	C	E	No
Gunnison sage-grouse	<i>Centrocercus minimus</i>	C	SC	Very slight possibility
Uncompahgre fritillary butterfly	<i>Boloria acrocneuma</i>	E	---	No
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	T	No
Clay-loving wild-buckwheat	<i>Eriogonum pelinophilum</i>	E	---	No
Uinta Basin hookless cactus	<i>Sclerocactus glaucus</i>	T	---	No

Notes: C = candidate
E = endangered
SC = special concern
T = threatened

Park biologists have determined that none of these species, except possibly the Gunnison sage grouse, are known to or possibly expected to inhabit the project site or adjacent lands, based on lack of suitable habitat, professional knowledge of the occurrence of these animals in the park, and a site-specific plant survey completed in 2003 (Chase 2004; also see Appendix A). The bald eagle is a winter resident only (no nesting in the park) and may pass over or near the site, but would not be expected to frequent the area due to the noise and disturbance associated with the pit and highway. The site and surrounding sagebrush habitat is similar to habitat preferred by the sage grouse. However, none has been observed or documented in or near the site, and none would be expected because of the use of the site. The closest lek (breeding area) is approximately 5 miles to the west (Oulton 2004).

State-Listed Species

In addition to the federally listed species, this EA examines state-listed animals and plants for potential impacts. Species listed by the State of Colorado were found on the CDOW website (CDOW 2004). Some of these are also federally listed species and are addressed above (see Table 3.2 – state status column). The remaining listed species were discussed with CDOW staff who manage the adjacent lands and the park Resource Management Specialist. Based on their professional knowledge and the habitat available on or near the site, none of the listed species are known or would be expected to inhabit the site. A few may be found on nearby forest lands or along the river corridor and could be affected by noise from the pit operations. These include the common garter snake, which could be found in the CDOW woods and riparian area to the west, and the swift fox, which may pass through this area, but would not be expected on the site itself. The raptors on the list such as the peregrine falcon, ferruginous hawk, and bald eagle may pass over or near the site during migration or hunting for prey, but do not nest in the area or frequent the area. The closest peregrine falcon nesting area is approximately 1/2 mile from the site (Chase 2004).

Plant species identified by the CNHP as species of concern were reviewed and compared to the site-specific survey conducted in 2003 (Appendix A). Two plants listed by the CNHP as “imperiled” were found on the site during a recent survey (Appendix A). These are the Gunnison milkvetch (*Astragalus anisus*), a vascular plant that is endemic to the Gunnison Basin in Gunnison and Saguache counties, within 35 miles of the Town of Gunnison, and Rollin’s twinpod (*Physaria rollinsii*), another local endemic species. CNHP in Fort Collins, Colorado, which maintains imperilment/conservation “rankings” for all species, has ranked both species as “G2 S2,” or imperiled. There are no state authorities or requirements for protecting or reducing impacts to imperiled species.

Gunnison milkvetch occurs in dry upland sagebrush areas and on dry gravelly flats and hillsides, usually among or under low sagebrush (*Artemisia nova*), at elevations of 7,500 to 8,500 feet (CNHP 2002). Other common species associated with Gunnison milkvetch are big sagebrush (*Artemisia tridentate*), blue grama (*Bouteloua gracilis*), muttongrass (*Poa fendleriana*), and pine needlegrass (*Stipa pinetorum*). Although there are less than 20 known populations in the world, *A. anisus* is not federally listed as threatened or endangered.

Gunnison milkvetch occurs most often in fairly open sites where sagebrush shrubs do not form a closed canopy (Decker 2003) and on dry, south to southwestern facing slopes of 2 to 20 degrees (Wasson 1998). It usually occurs on sandy to gravelly granitic soils, but is not restricted to any one soil type. A small population of Gunnison milkvetch is present on the site and could be affected if the expansion would occur. Because the species is known to occur in

the site, additional research was conducted to find out more about its distribution and characteristics.

Gunnison milkvetch occurs throughout much of the sagebrush shrubland habitat in this region, and there are at least 100 recorded occurrences within the population in the Gunnison Basin. It has been recorded at a number of locations in the east half of Curecanti National Recreation Area (east of Blue Mesa Dam), according to data obtained from Decker (2003), Wasson (2003) and Peterson (2003). Recorded locations in the park are on the north side of the reservoir near Dry Creek, and east and west of Red Creek. On the south side, recorded locations are on Sapinero Mesa, east of Cebolla Arm, and west of US 149. Gunnison milkvetch is likely to occur at other unrecorded locations in the park as well. Within occurrences, plants are typically distributed in clusters of 3 to 10 individuals in widely scattered clusters over 40 or more acres (Wasson 1998). Densities are low, typically two to three plants per acre.

There are three occurrences for Rollin's twinpod in the CNHP database, and there were 14 specimens in local Colorado herbaria from four counties (Mesa, Gunnison, Pitkin, and Garfield) collected between 1898 and 1996 (Menefee 2004). The species is a Colorado and probably local endemic. According to the biotechnician who is assisting the park with its vegetation mapping project, it is much more prevalent in sagebrush-grassland communities than the Gunnison milkvetch and other state-listed species (Bradshaw 2004).

Impacts of Alternative A, No Action, on Species of Management Concern

Federally Listed Species

Under Alternative A, No Action, the proposed expansion would not occur and the current pit operations would continue for another 1 to 3 years. Impacts to federally listed species would be limited to any impacts from the noise generated at the site to passing bald eagles or to Gunnison sage grouse that may be present in adjacent sagebrush communities. Noise impacts would be short term, sporadic, and result in avoidance of the site area or possibly flight responses at most, a negligible short term adverse impact that would decrease with distance from the site. Since there are no breeding areas (leks) for sage grouse on or near the site, and none would be expected very close to the site, impacts to this species would be considered negligible. Based on the limited extent of disturbances that would continue under Alternative A, this alternative would have no effect on any listed federal species.

State-Listed Species

Under Alternative A, No Action, impacts to state-listed species such as swift fox, ferruginous hawk, or peregrine falcon that could pass over or near the site in adjacent woodlands would be limited to short term, sporadic, and minimal impacts from noise associated with site operations. No other state-listed species not already addressed under federally listed species would be expected on the site. During a recent site-specific survey, the presence of the listed plant species was not noted on the remaining area of the site that would be disturbed. Therefore, Alternative A would have negligible or no effects on state-listed species.

Cumulative Impacts

Cumulative impacts to any listed species of management concern would consist of adverse impacts from other land disturbing activities within the area of analysis, including construction and maintenance of use areas and also from noise associated with highway traffic, visitor use, and recreation activities on the lake and river, including boating. For the most part, the lands are protected by the NPS, BLM, and/or CDOW, and impacts from land-disturbing activities

would be limited by compliance with NEPA or permit conditions for all actions. Known sites of imperiled plants within the park and adjacent governmental properties would be protected. Therefore, cumulative impacts to listed species would be long term, negligible to minor, and adverse.

Conclusions

Under Alternative A, the Dickerson Pit would not expand. There would be no adverse impacts to any federally listed species of management concern, since none are known to inhabit that area, and state-listed species would incur no effect to short term, negligible, adverse impacts from operational noise. Cumulative impacts to listed species would be adverse, negligible to minor and long term. No impairment to any listed species would result from the implementation of the alternative.

Impacts of Alternative B, Proposed Action, on Species of Management Concern

Federally Listed Species

Similar to Alternative A, No Action, there would be no or negligible adverse impacts to federally listed species under Alternative B. There would be an additional 19.5 acres of disturbance and an extended length of time for operation, so that the minimal effects on bald eagle or Gunnison sage grouse, if present, may be extended over time. However, given the lack of use of the site by these species and the lack of breeding locations near the site for both these species, effects would still be considered short term, sporadic, and negligible. No other federally listed species would be expected on or near the site. Based on this, there would be no effect on federally listed species from implementing Alternative B.

State-Listed Species

Under Alternative B, there would potentially be similar impacts to state-listed animal species (peregrine falcon, ferruginous hawk, and swift fox) that may occur in nearby woodland, roost along the Gunnison River, or that may fly over the site, due to the noise associated with site operations that would carry into these areas. However, this noise would not be permanent or consistent, and would fade to about background levels within 1,500 feet from the source. There could be avoidance of the site and possibly flight or startle responses from these species especially from sudden noises, since noise levels originating from loud equipment (over 80 dB) would be above background in the area within the 1,500-foot area of analysis shown on Figure 3.5. However, these adverse impacts would be considered short term, localized, and minor, since no breeding individuals would be affected and the impacts would not extend far from the pit.

Regarding state-listed plants, both the Gunnison milkvetch and the Rollin's twinpod were identified in the proposed expansion area. Removing the federally-owned surface estate to mine the remaining 19.5 acres would result in a direct loss of these plants at the site. Regarding the Gunnison milkvetch, there are at least four other *A. anisus* populations in the park and suitable habitat for the species is widespread in the Gunnison valley. Transplanting was considered, but it is not likely to be successful due to the extensive root structure. It is possible to collect the seed for the population prior to disturbing that part of the site, and the park staff will do this and attempt to grow seedlings, which can then be transplanted at a later date. Regarding the Rollin's twinpod, there are several other occurrences within Gunnison County, and it is relatively common locally within sagebrush-grassland communities (Menefee 2004; Bradshaw 2004). Also, *Physaria spp.* Are relatively easy to grow from seed and can grow in disturbed areas. Therefore, if the seedbank is preserved, it should be possible to regrow the

plants from seed on other nearby disturbed areas (Dawson 2004). The park staff will collect seed from both state-listed species prior to the removal of the surface, and will use these for transplanting these species in other suitable habitat within the park.

There are no state authorities or regulations protecting these plants, and it is recognized that they are likely to be common in the Gunnison area. For this reason, removing the plants located within the pit boundaries is considered a long term, moderate, adverse impact.

Cumulative Impacts

Cumulative impacts to listed species under Alternative B would be similar to those discussed for Alternative A, with the addition of the moderate adverse effect on the state-imperiled Gunnison milkvetch and Rollin's twinpod populations. Cumulative impacts would be considered long term, negligible to moderate and adverse.

Conclusion

Under Alternative B, the Dickerson Pit would be allowed to expand, resulting in disturbance of an additional 19.5 acres. However, there would be no adverse impacts to any federally listed species of management concern, since none are known to inhabit that area. State-listed animal species would incur minor effects from noise that could be above background levels in adjacent areas where these species may roost or pass by. Small local populations of the Gunnison milkvetch and Rollin's twinpod, which are, species listed by the CNHP as imperiled, would be lost. Because these species are common in this area, and seeds would be collected for transplanting by the NPS staff, adverse impacts would be considered moderate. Cumulative impacts to species of management concern would be considered long term, negligible to moderate, and adverse. No impairment to any listed species would result from the implementation of this alternative.

3.8. Impacts on Archeological Resources

Methodology

The description of effects on cultural resources presented in this section is intended to comply with the requirements of the NEPA and Section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's (ACHP's) regulations implementing Section 106 of the National Historic Preservation Act (36 CFR Part 800, *Protection of Historic Properties*), impacts to cultural resources were 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 in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register of Historic Places; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the ACHP's regulations, a determination of either adverse effect or no adverse effect must also be made for affected, National Register-eligible cultural resources. An "adverse effect" occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register of Historic Places. An example is if the impact diminished the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the preferred alternative 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 is an effect, but the effect would not diminish in any way the

characteristics of the cultural resource that qualify it for inclusion in the National Register of Historic Places.

CEQ regulations and NPS Director's Order 12: *Conservation Planning, Environmental Impact Analysis and Decision Making* (NPS 2001d) 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 (for example, reducing the intensity of an impact from major to moderate or minor). Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Cultural resources are nonrenewable 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 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the conclusions of the impact analysis section for cultural resources located within the study area. The Section 106 summary is intended to meet the requirements of Section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based upon the criterion of effect and criteria of adverse effect found in the ACHP's regulations.

- Negligible:** Impact 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:** **Adverse:** disturbance of a site(s) results in little, if any, loss of integrity. The determination of effect for Section 106 would be no adverse effect. **Beneficial:** maintenance and preservation of a site(s). The determination of effect for Section 106 would be no adverse effect.
- Moderate:** **Adverse:** disturbance of a site(s) results in loss of integrity. The determination of effect for Section 106 would be adverse effect. A Memorandum of Agreement is executed among the NPS and applicable SHPO or tribal historic preservation officer, and if necessary, the ACHP in accordance with 36 CFR 800.6(b). Measures identified in the Memorandum of Agreement to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate. **Beneficial:** stabilization of a site(s). The determination of effect for Section 106 would be no adverse effect.
- Major:** **Adverse:** disturbance of a site(s) results in loss of integrity. The determination of effect for Section 106 would be adverse effect. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the NPS and applicable SHPO or tribal historic preservation officer and/or ACHP are unable to negotiate and execute a Memorandum of Agreement in accordance with 36 CFR 800.6(b). **Beneficial:** active intervention to preserve a site(s). The determination of effect for Section 106 would be no adverse effect.

For the purposes of this analysis, the geographic area of analysis is defined as the property boundary of the quarry.

Affected Environment

Archeological surveys conducted at Curecanti National Recreation Area have resulted in the identification of 221 archeological sites (NPS 1999). Archeologists have uncovered evidence of prehistoric hunting and gathering camps all around what is now Blue Mesa Reservoir, but which once were open benches above the river from which large and small game could be spotted. At a few of these camps where large amounts of lithics (stone points and tools) were found, archeologists dug deeper to discover stone-lined hearths in which burned remains of wood, animals and plants were found. This charcoal was a crucial discovery because it can be dated through an extensive radiocarbon dating process that scientifically determines the dates when these camps were occupied. Archeologists then compare these radiocarbon dates with spear point, stone tool, and/or arrowhead styles found at the same site to verify when the camp was occupied. Samples of animal and plant remains are also analyzed to see if the environment has changed over the last 10,000 years. All this archeological evidence is crucial to determining how people adapted and survived in this region.

At the Dickerson Pit location, Site 5GN1277, which has been determined eligible for listing in the National Register of Historic Places, covers much of the area between the NPS and CDOW boundary and the existing pit. The site is a large scatter of artifacts with associated circular alignments of stones and buried cultural features. Archeological testing of the site has resulted in identifying two discrete areas, one at the north end and one at the south end, that contain deposits that could yield additional information important to our understanding of the prehistory of the region. A data recovery plan designed to collect and analyze this information has been prepared (Baumann 2004).

Impacts of Alternative A, No Action, on Archeological Resources

Under Alternative A, No Action, the Dickerson Pit would not expand, resulting in no new impacts on archeological resources.

Cumulative Impacts

As is true for both alternatives, a number of cultural resources have sustained adverse impacts from natural and human disturbance over the lengthy period of human occupation of the area. The majority of the park has not been formally inventoried for cultural resources, so these as yet unidentified resources, especially any exposed archeological resources on or located near the surface, are particularly vulnerable to human and natural impacts. Cumulative natural impacts (such as erosion and general weathering) and human impacts (inadvertent ground disturbance, vandalism, artifact collection, digging) that results in resource loss are expected to continue, creating adverse impacts of unknown intensity to cultural resources. Ultimately, the resource base would be diminished, resulting in an incomplete historical record and likely errors in cultural interpretation.

Dam and reservoir construction during the 20th century, along with construction of related hydroelectric facilities and transmission lines, likely resulted in major, cumulative adverse impacts to cultural resources that continue today. Filling of reservoirs undoubtedly inundated an unknown number of prehistoric and historic cultural resources.

Ongoing adverse impacts to cultural resources from recreational users also exist within the park. Archeological resources are particularly vulnerable to ground disturbance. In general, these cumulative, adverse impacts to cultural resources are of unknown intensity because so little of the area has been inventoried and evaluated. Periodic and systematic monitoring of known resource conditions by NPS staff likely aids in mitigating adverse impacts to known cultural resources, possibly to the negligible to minor and site-specific level.

Conclusion

Under Alternative A, there would be no direct adverse impacts to archeological resources by completing the mining at the pit. There would be a continued cumulative loss of unknown intensity of archeological resources from the ongoing natural and user-related impacts. No impairment to any archeological resource would result from the implementation of this alternative.

Impacts of Alternative B, Proposed Action, on Archeological Resources

Under Alternative B, Proposed Action, the pit would be expanded and archeological Site 5GN1277 would be destroyed. The Colorado SHPO has determined that this would result in an adverse effect under Section 106 of the National Historic Preservation Act. A Memorandum of Agreement between the NPS and the SHPO, which would stipulate the measures that the NPS needs to take to resolve this adverse effect, was executed on February 6, 2004 (Appendix C). These stipulations would be part of the permit requirements governing the pit expansion. Although the archeological site would be adversely affected, the effect would be treated through data recovery, and therefore, the proposed pit expansion would have a moderate impact on archeological resources.

Cumulative Impacts

Under Alternative B, cumulative impacts to archeological resources would be similar to those described under Alternative A, with the expansion of mining at the site adding moderately to the direct cumulative adverse impacts.

Conclusion

Under Alternative B, there would be a direct adverse effect to archeological Site 5GN1277. The effect would be treated and minimized through data recovery and is thereby considered a moderate adverse impact. There would be continued cumulative loss of unknown intensity of archeological resources from the ongoing natural and user-related impacts. No impairment to any archeological resource would result from the implementation of this alternative.

3.9. *Impacts on Visitor Use and Experience*

Methodology

Impacts to visitor use and experience were analyzed by reviewing visitor data and personal observations of visitation patterns, combined with an assessment of what is available to visitors under current management. Impacts relating to noise and visual intrusion are included in the assessment.

- Negligible:** The impact is barely detectable and/or will affect few visitors.
- Minor:** The impact is slightly detectable and/or will affect few visitors.
- Moderate:** The impact is readily apparent and/or will affect some visitors.
- Major:** The impact is severely adverse or exceptionally beneficial and/or will affect many visitors.

The geographic area of analysis for impacts to visitor use and experience is defined as the park boundary.

Affected Environment

The park is located in a sparsely populated area of Colorado. The nearest cities are Gunnison, Montrose, and Grand Junction. The nearest large metropolitan area is Denver, located 200 miles to the northeast.

Visitor use typically begins to increase in May and peaks in July, with the fewest visitors in December. Annual park visitation in 2003 was 1,008,810. The park is situated adjacent to the Black Canyon of the Gunnison National Park and is en route for many people who tour the national parks in the region (for example, Mesa Verde National Park, Rocky Mountain National Park, Canyonlands National Park, Arches National Park).

The park stretches 35 miles along the Gunnison River corridor and is surrounded by a patchwork of private land and hundreds of thousands of mostly undeveloped acres of BLM and National Forest Service lands. This setting provides a character of isolation, with park development mostly occurring along US 50. Three dams along the Gunnison River were constructed between 1963 and 1977, which are the three reservoirs along the Gunnison River within the park – Crystal Reservoir, Morrow Point Reservoir, and Blue Mesa Reservoir.

Blue Mesa Reservoir, which is 20 miles long and has 96 miles of shoreline, is the largest water body in the state of Colorado. Water-related activities include the use of speedboats, canoes, sailboats, sailboards, and kayaks. Other summer activities include fishing, sightseeing photography, wildlife watching, swimming, hiking, backpacking, developed and backcountry camping, and picnicking.

The park facilities and recreation areas in the area of analysis include (see Figure 1.1):

- Beaver Creek – parking area, picnic area, and fishing access point – approximately 1,200 feet to the south of the site boundary along US 50
- Cooper Ranch – parking area, picnic area, and trailhead – approximately 2,200 feet to the north of the site boundary along US 50
- Neversink – parking area, picnic area, trailhead, and fishing access point – beyond 6,000 feet to the north of the site along US 50

Impacts on the visitor from the Dickerson Pit expansion project are expected to be from viewing the increased truck traffic, viewing the pit upon entering the park from the east (see Figure 3.7), and being subjected to the noise generated by blasting and crushing operations. Table 3.3 shows noise levels for various conditions. The Dickerson Pit is located along US 50, the main east/west highway in the region. Average annual daily traffic along US 50 from Gunnison to SH 149 was 6,104 vehicles in 2002 (CDOT 2003). Noise levels within this area of the park have not been measured, but would be affected by traffic along US 50, other visitors, and the activities occurring at the pit.

Table 3.3 – Sound Level Comparison Chart

Decibels	How it Feels	Equivalent Sounds
140-160	Near permanent damage level from short exposure	Large caliber rifles (e.g., .243, 30-06).
130-140	Pain to ears	.22 caliber weapon.
100	Very loud	Air compressor at 20 feet'; garbage trucks and city buses; average dozers and scrapers.
	Conversation stops	Power lawnmower; diesel truck at 25 feet.

Decibels	How it Feels	Equivalent Sounds
90	Intolerable for phone use	Steady flow of freeway traffic; 10-horsepower outboard motor; garbage disposal; average crushers and screens; near some drill rigs.
88		Average dB level for sand and gravel equipment.
80		Near drill rig, automatic dishwasher or vacuum cleaner (80 dB).
70		Drill rig at 200 feet.
60	Quiet	Window air conditioner in room; normal conversation, drill rig at 800 feet.
50	Sleep interference	Quiet home in evening.
40		Frontcountry camping or developed site, drill rig at 1,500 feet.
30		Soft whisper.
20		In a quiet house at midnight; leaves rustling; remote sites (Death Valley; interior wooded areas with backcountry camping).

Note: Modified from Final Environmental Impact Statement, Lake Meredith Oil and Gas Management Plan/EIS, 2001, plus Cloues, pers. comm.. (2004).



Figure 3.6. Site View from Highway 50, Entering Park from East

Impacts of Alternative A, No Action, on Visitor Use and Experience

Under Alternative A, No Action, the pit would not expand beyond 12.4 acres. Impacts on visitor use and experience in the analysis area would continue until the 12.4-acre limit was reached, in approximately 1 to 3 years.

All visitors to the park coming from Gunnison drive directly towards the pit and can see the disturbed area from their cars. Those coming from the west have a visual buffer along the south

and west sides of the pit, preventing a direct visual of the disturbed area. The area would be reclaimed after all operations cease, and the area revegetated with native grasses. This would reduce the adverse visual effect of the pit, but the area would still look somewhat “non-natural” for many years. Visual impacts from the pit under Alternative A would be long term, negligible to minor, and adverse.

Noise impacts would not increase over current conditions. Blasting at the pit occurs once or twice per year and lasts only a few days. The Special Use Permit limits crushing operations; the crusher is only allowed on site for a maximum of 90 days. Since blasting occurs below the ground surface, noise impacts from that source would be negligible. The crusher creates an average noise level of 90 dBA at the source. Noise levels drop approximately 6 dBA for every doubling of distance (Stanford University 2004). At the nearest surrounding park facilities such as the Beaver Creek and Cooper Ranch picnic areas along US 50, noise from the crusher would drop to below 40 dB, which would be below the expected background levels at these locations, and equivalent to frontcountry park uses. Activities on the site would result in short term, negligible to minor, adverse impacts related to noise. Impacts would be highest during the visitor use period from May through September and would be concentrated in the eastern edge of the park.

Truck traffic entering and leaving the pit and blasting pose potential risks to visitor safety. Signage is required at the access road gate during operations to prevent unauthorized entry by park visitors to protect visitor safety. Traffic along US 50 is halted during blasting to protect highway users. Impacts to visitor use from truck traffic under current operational levels would be short term and minor.

Pit operations would have minimal impact to visitor recreational use in the park. There are only a few recreation areas close to the pit, and generally the pit is not visible from these; also as explained above, noise impacts would be minimal. There are no interpretative areas or trails in the vicinity of the pit that would be disturbed.

Existing uses, including activities at the pit, would result in localized, mostly short term, negligible to minor, adverse impacts on visitor use and experience within the analysis area.

Cumulative Impacts

Under Alternative A, No Action, cumulative impacts on visitor use and experience throughout the park could result from the visual impact of human developments on the natural scenery associated with the continuing operation of the pit, visitor use within the park, and traffic levels along US 50. Other park activities that could contribute to impacts include prescribed fires, routine maintenance of park roads, and park and visitor vehicle use. Cumulative impacts could also result from conflicts between visitor uses and over-use of park resources and developments. Degradation of park resources and values could affect park visitors’ perception of the park and their experience.

Cumulative impacts on visitor use and experience throughout the park are expected to be localized near developments or activities, with short to long term, minor to moderate, adverse impacts.

Conclusion

Under Alternative A, No Action, the pit would not expand beyond 12.4 acres. Visual impacts from the continued pit operations and eventual reclamation of the site would be long term, negligible to minor, and adverse. Activities on the site would result in short term, negligible to minor, adverse impacts related to noise. Cumulative impacts on visitor use and experience

throughout the park are expected to be localized near developments or activities, with short to long term, minor to moderate, adverse impacts.

Impacts of Alternative B, Proposed Action, on Visitor Use and Experience

Under Alternative B, Proposed Action, the pit would expand to utilize nearly the entire mineral reservation of 33.16 acres, minus 1.22 acres reserved as a visual buffer. Impacts on visitor use and experience within the analysis area would be greater than Alternative A. With the extended operation period (up to 42 years) and the potential increased level of activity, impacts could increase to moderate levels at times.

Currently, visitors traveling west on US 50 directly towards the pit can see the disturbed area and those traveling east on US 50 have a visual buffer along the south and west sides of the pit, preventing a direct visual of the disturbed area. The expansion of the pit would open a larger disturbed area visible to westbound traffic and remove the top of the western ridge. The 1.22-acre visual buffer would place a barrier along US 50 between the highway and the pit. Mitigation for visual impacts would include the 1.22-acre buffer and applying soil to the most visible areas at the start of reclamation. Reclamation of the site would involve grading to a 2:1 slope and revegetation, with the eventual establishment of a more natural appearance. Overall, visual impacts from the expansion of pit would be long term, minor to moderate, and adverse.

Noise impacts would increase over current conditions. Blasting at the pit would be more frequent and last from 1 to 2 weeks at a time. Although the frequency would be greater, the noise impacts would be similar to those from Alternative A, since blasting occurs below the ground surface. Similar to Alternative A, crushing operations will be limited to a maximum of 90 days at a time. As the area of the pit expands, noise from the pit activities would move closer to the edge of the mineral estate and park facilities. The closest park facilities to the mineral estate boundary are Cooper Ranch and Beaver Creek at approximately 1,200 feet away. Drilling or crushing would create an average noise level of 90 dbA at the source. Noise levels drop approximately 6 dBA for every doubling of distance (Stanford University 2004). Therefore, noise from mining would be expected to drop to approximately 40 to 50 dBA, which would be about the same as the expected background noise levels in these locations near US 50. Activities on the site would result in short and long term, minor to moderate, adverse impacts related to noise. Impacts would be highest during the visitor use period from May through September and would be concentrated in the eastern edge of the park. The operator is required to comply with all state and local noise regulations.

Increased truck traffic entering and leaving the pit and blasting pose potential risks to visitor safety and would cause more interruption to visitor use and experience at the park entrance. Signage is required at the access road gate during operations to prevent unauthorized entry by park visitors to protect visitor safety. Traffic along US 50 would be halted during blasting to protect highway users, as is done currently. Impacts to visitors traveling along US 50 would vary, depending on the number of trucks entering and leaving the site. With truck traffic reaching 120 trucks per day, adverse impacts to visitors entering and leaving the park could be moderate at times.

As mentioned for Alternative A, the pit operations are not near enough to any highly used recreation or interpretive area, and there are no trails in the immediate vicinity of the pit. Therefore, there would be negligible to minor adverse impacts to recreation use.

Existing uses, including activities at the pit, would result in localized, short to long term, negligible to moderate, adverse impacts on visitor use and experience within the analysis area.

Cumulative Impacts

Under Alternative B, Proposed Action, cumulative impacts on visitor use and experience throughout the park would be similar to those described under Alternative A, with impacts from existing and future development at the pit, visitor uses, and traffic along US 50 resulting in short to long term, minor to moderate, adverse impacts.

Conclusion

Under Alternative B, Proposed Action, the pit would expand to utilize the full mineral reservation of 33.16 acres, minus 1.22 acres reserved as a visual buffer. Existing impacts on visitor use and experience within the analysis area would be similar to Alternative A, but over an extended time period and at more intense levels at times. Impacts to visitors from the pit operation, noise and general disturbance would be localized, short to long term, negligible to moderate, and adverse. Visual impacts from the pit would be long term, minor to moderate, and adverse. Impacts to recreation use in the vicinity of the pit would be negligible to minor. Cumulative impacts on visitor use and experience throughout the park would be expected to be localized near developments or activities, with short to long term, minor to moderate, adverse impacts.

4.0. CONSULTATION AND COORDINATION

In December 2003, the NPS mailed a public scoping newsletter to over 190 individuals, organizations, and government agencies and posted it on the Curecanti National Recreation Area website. The newsletter announced the beginning of the scoping process for the Dickerson Pit Expansion Environmental Assessment. The public scoping newsletter and website requested public participation. This newsletter is on file at the NPS Intermountain Support Office - Santa Fe, and Curecanti National Recreation Area. A press release was sent to the *Daily Sentinel* in Montrose, Colorado and the *Gunnison Country Times* in Gunnison, Colorado. The press releases provide information about the project and requested scoping comments. The formal public scoping period was from November 24 to December 31, 2003.

Nine comment letters were received during the formal public scoping period. Five were received from individuals, one from a state agency (Colorado Historical Society), one from a federal agency (Natural Resources Conservation Service) and two from organizations (High Country Citizen's Alliance and the National Parks Conservation Association).

The comments received by the NPS during formal public scoping were related to: (1) impacts from erosion; (2) impacts to water quality; (3) impacts to noise and air quality due to traffic and mining operations; (4) visual impacts; (5) wildlife impacts; (6) impacts to visitor experience; (7) impacts to cultural resources; (8) impacts to vegetation and the potential introduction of noxious weeds; and (9) mitigation and reclamation strategies.

A Notice of Availability for the Plan of Operations and EA will be published in the *Daily Sentinel* in Montrose, Colorado and the *Gunnison Country Times* in Gunnison, Colorado, announcing the availability of these documents for a 30-day review.

Following the 30-day public review period, the NPS will consider all comments received. Additional mitigation measures resulting from the public involvement process may be applied by the NPS as conditions of approval of the Plan of Operations, as necessary.

4.1. Individuals and Agencies Consulted

Persons and agencies contacted for information, or that assisted in identifying important issues, developing alternatives, or analyzing impacts are listed below:

Linda Dansby, Regional Minerals Coordinator and Project Manager, National Park Service, Intermountain Region, Santa Fe, New Mexico

Linda Alick, Chief Ranger, Black Canyon of the Gunnison National Park/Curecanti National Recreation Area, Gunnison, Colorado

Marianne August, GIS Specialist, Black Canyon of the Gunnison National Park/Curecanti National Recreation Area, Gunnison, Colorado

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Julia Brunner, Regulatory/Policy Specialist, National Park Service, Geologic Resources Division, Denver, Colorado

Jerry Burgess, Facilities Manager, Black Canyon of the Gunnison National Park/Curecanti National Recreation Area, Gunnison, Colorado

Myron Chase, Resource Management Specialist, Black Canyon of the Gunnison National Park/Curecanti National Recreation Area, Gunnison, Colorado

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Lisa Norby, Geologist, National Park Service, Geologic Resources Division, Denver, Colorado
Ken Stahlnecker, Chief of Resource Stewardship and Science, Black Canyon of the Gunnison
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William Wellman, Superintendent, Black Canyon of the Gunnison National Park/Curecanti
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4.2. List of Document Recipients

Gunnison Gravel, Warren Wilcox, Manager
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Congressional Delegation

Senator Ben Nighthorse Campbell
Senator Wayne Allard
Congressman Scott McInnis

Federal Agencies

Department of the Interior's Office of the Solicitor
Deborah Heacox, Denver
National Park Service:
Intermountain Regional Director, Stephen Martin
Colorado State Director, Ron Everhart
Intermountain Region Minerals Coordinator, Linda Dansby
Geologic Resources Division, Carol McCoy
Intermountain Support Office, Jim Bradford
Curecanti National Recreational Area, Bill Wellman
U.S. Bureau of Land Management, Barry Tollefson
U.S. Bureau of Reclamation, Carol DeAngelis
U.S. Fish and Wildlife Service, Allan Pfister
U.S.D.A. Forest Service, Jim Dawson
U.S.D.A. National Resources Conservation Service, John Scott

Tribal Governments

Northern Ute Tribal Council, Roland McCook, Chairperson
Southern Ute Tribal Council, Howard Richards Sr., Chairperson
Ute Mountain Ute Tribal Council, Ernest House, Chairperson

State Government

State Senator Lewis Entz
State Representative Gregg Rippy
Governor Bill Owens
Colorado Department of Transportation
Colorado Division of Minerals and Geology

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Colorado Historical Society, Georgianna Contiguglia
Colorado Natural Heritage Program, Director

County Government

Gunnison County Board of County Commissioners
Gunnison County Planner, Joanne Williams
Montrose County Board of County Commissioners
Montrose County Planner, Rick Gibbons

City Government

City of Gunnison, Mark Collins, City Manager
City of Montrose, John Schneider, City Manager

Organizations

Club 20, Reeves Brown
Colorado Environmental Coalition
Gunnison Chamber of Commerce, Tammy Scott
High Country Citizens Alliance, Wendy McDermott, Executive Director
National Parks & Conservation Assoc, Thomas Kiernan
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Western Colorado Congress, Bill Patterson
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Media

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APPENDIX A - SITE PLANT LIST

Plant Species of the Dickerson Pit Site
(Survey conducted by Danguole Bockus, Ginger Bradshaw, Jenn Blum,
and Therese Ritz, July 10, 2003)

Latin Name	Common Name	Comments
(standardized to the PLANTS database: http://plants.usda.gov/)		
Shrubs and Subshrubs		
<i>Amelanchier utahensis</i>	Utah serviceberry	
<i>Artemisia frigida</i>	fringed sagewort	
<i>Artemisia tridentata ssp. wyomingensis</i>	Wyoming big sagebrush	
<i>Cercocarpus montanus</i>	mountain mahogany	
<i>Chrysothamnus depressus</i>	longflower rabbitbrush	
<i>Chrysothamnus viscidiflorus</i>	sticky rabbitbrush	
<i>Ericameria parryi</i>	Parry's rabbitbrush	
<i>Juniperus scopulorum</i>	Rocky Mountain juniper	
<i>Krascheninnikovia lanata</i>	winterfat	
<i>Leptodactylon pungens</i>	spiny gilia	
<i>Opuntia polyacantha</i>	prickly pear	
<i>Pediocactus knowltonii</i> (very questionable, but possible)	Knowlton's miniature cactus	
<i>Pediocactus simpsonii</i>	Simpson hedgehog cactus	
<i>Prunus virginiana</i>	chokecherry	
<i>Purshia tridentata</i>	antelope bitterbrush	
<i>Rhus trilobata</i>	skunkbush sumac	
<i>Ribes cereum</i>	wax current	
<i>Sphaeralcea coccinea</i>	scarlet globemallow	
<i>Symphoricarpos rotundifolius</i>	snowberry	
<i>Yucca harrimaniae</i>	Spanish bayonet	
Grasses and Grasslikes		
<i>Achnatherum pinetorum</i>	pine needlegrass	
(<i>Achnatherum lettermannii</i>)	Letterman's needlegrass	did not see, but on earlier list
<i>Bouteloua gracilis</i>	blue grama grass	
<i>Bromus tectorum</i>	cheatgrass	
<i>Carex duriuscula</i>	sedge	
<i>Carex geophylla</i>	ground-loving sedge	
<i>Elymus elymoides</i>	bottlebrush squirreltail	
<i>Hesperostipa comata</i>	needle-and-thread grass	
<i>Koeleria macrantha</i>	prairie junegrass	
<i>Pascopyrum smithii</i>	western wheatgrass	
<i>Pleuraphis jamesii</i>	galleta grass	
<i>Poa secunda</i>	Sandberg bluegrass	
(<i>Poa fendleriana</i>)	muttongrass	did not see, but on earlier list---easily confused with <i>P. secunda</i>

Latin Name	Common Name	Comments
Forbs		
<i>Allium cernuum</i>	nodding onion	
<i>Androsace septentrionalis</i>	rock-jasmine	
<i>Antennaria parvifolia</i>	pussytoes	
<i>Astragalus anisus</i>	Gunnison milkvetch	
<i>Arabis crandallii</i>	Crandall's rockcress	
<i>Calochortus gunnisonii</i>	Gunnison's mariposa lily	
<i>Castilleja sp.</i>	Indian paintbrush	
<i>Chaenactis douglasii</i>	dusty maiden	
<i>Chenopodium leptophyllum</i>	narrowleaf goosefoot	
<i>Comandra umbellata</i>	bastard toadflax	
<i>Cryptantha flavoculata</i>	Cryptanthra	
<i>Descurainia pinnata</i>	tansy mustard	
<i>Erigeron concinnus</i>	Navajo fleabane	
<i>Erigeron pumilus</i>	shaggy fleabane	
<i>Eriogonum racemosum</i>	redroot buckwheat	
<i>Eriogonum umbellatum</i>	sulphur-flower buckwheat	
<i>Gilia pinnatifida</i>	sticky gilia	
<i>Hymenopappus filifolius</i>	fineleaf hymenopappus	
<i>Ipomopsis aggregata</i>	scarlet gilia	
<i>Lappula occidentalis var. occidentalis</i>	flatspine stickseed	
<i>Lepidium sp.</i>	pepperweed	
<i>Lupinus sericeous</i>	silky lupine	
<i>Mirabilis linearis</i>	narrowleaf four-o'clock	
<i>Oenothera caespitosa</i>	tufted evening-primrose	
<i>Penstemon teucroides</i>	germander beardtongue	
<i>Phlox hoodii</i>	cushion phlox	
<i>Physaria rollinsii</i>	Rollins' twinpod	
<i>Potentilla pulcherrima x hippiana</i>	beautiful cinquefoil	
<i>Potentilla sp.</i>	cinquefoil	
<i>Salsola tragus</i>	Russian thistle	
<i>Schoenocrambe linifolia</i>	skeleton mustard	
<i>Sisymbrium altissimum</i>	tall tumbledustard	
<i>Solanum triflorum</i>	cutleaf nightshade	
<i>Solidago missouriensis</i>	Missouri goldenrod	
<i>Stephanomeria runcinata</i>	desert wirelettuce	
<i>Tetraneris torreyana</i>	Torrey's four-nerve daisy	

APPENDIX B - CONSULTATION LETTERS

**APPENDIX C - MEMORANDUM OF AGREEMENT WITH
COLORADO STATE HISTORIC PRESERVATION OFFICE**