

Fort Stanton-Snowy River Cave National Conservation Area Proposed Resource Management Plan Amendment and Environmental Assessment

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BLM

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I. INTRODUCTION

Historic Fort Stanton was established in 1855, and the surrounding area was reserved as a military reservation by Executive Order in 1859. Military use of the reservation ceased in 1895 and the land was transferred to the control of Secretary of the Interior the following year. It lay abandoned for over three years, until, in 1899, the military again reserved control of the area for use by the Marine Hospital Service. In 1953 the General Services Administration declared the area surplus. In 1956, about 1800 acres including the hospital buildings were conveyed to the State of New Mexico's Department of Public Welfare for use as a hospital and control of the remaining area was returned to the Department of the Interior. In 1964 a Range Study Agreement was entered between the Bureau of Land Management (BLM) and New Mexico State University covering the Fort Stanton lands. That agreement ended in 1990. In 1987 the Sierra Blanca Regional Airport opened an area in the southeast section of the former Fort Stanton Military Reservation.

The 1997 Roswell Approved Resource Management Plan (RMP) established the Fort Stanton Area of Critical Environmental Concern (ACEC), encompassing 24,630 acres of BLM public surface and 27,622 acres of federal mineral estate. The airport and Fort Stanton Monument, although within the established boundary, are managed by the City of Ruidoso and State of New Mexico. In 2001 the discovery of Snowy River Passage in Fort Stanton Cave, eventually propelled the area to the limelight as a special place that needed to be protected.

The Fort Stanton Area of Critical Environmental Concern (ACEC) was established in the RMP and Record of Decision. The management goal for the ACEC was to:

Protect the biological, archaeological and scenic qualities of Fort Stanton, while providing for quality recreation opportunities.

One of the prominent features of the ACEC is Fort Stanton Cave, designated as a National Natural Landmark in 1975. The cave has been the site of numerous scientific explorations and in 2001 one such exploration resulted in the discovery of a new, undisturbed passageway. This passageway led to a floor formation of continuous snow-white calcite – the Snowy River Passage. A truly unique formation, the Snowy River Passage was the catalyst that brought about the designation of Fort Stanton-Snowy River Cave National Conservation Area (NCA) through the Omnibus Public Land Management Act of Congress in 2009. This designation effectively transformed the Fort Stanton ACEC, along with an additional 246 acres, into the NCA and placed it within the BLM National Landscape Conservation System (NLCS), a network of BLM-administered landscapes recognized for their outstanding cultural, ecological and scientific values.

Table 1. Summary of legislative objects and requirements

<p>The Omnibus Public Land Management Act of 2009 (Public Law 111-11), Subtitle C, Section 2202 established the Ft. Stanton-Snowy River Cave NCA <i>“to protect, conserve, and enhance the unique and nationally important historic, cultural, scientific, archaeological, natural, and educational subterranean cave resources of the Fort Stanton-Snowy River cave system.”</i> These resources and values for which the NCA was established are referred to as <i>“NCA objects.”</i> Part of the NCA planning process is to provide more specific definitions of these NCA objects. These are provided below.</p>		
NCA Object	Definition	Narrative
HISTORIC	The Fort Stanton-Snowy River Cave contains numerous historic objects in the front portion of the cave.	Objects are present from the entrance of the cave through Conrad’s Passage and to Twenty Steps and Three Way Hill that include, but are not limited, to a ruined boat, historic wall inscriptions, sculpture-like objects made of mud, a rock enclosure, and carbonized fragments that may be remnants of cane torches. These objects span the Nineteenth and Twentieth Centuries.
CULTURAL	The Fort Stanton-Snowy River Cave contains cultural links to indigenous and contemporary communities.	The Fort Stanton Cave has been subject to modern exploration beginning around 1970. A number of digs, reinforcements, gates, and instruments have been and continue to be utilized to allow cavers to safely enter new portions of the cave for continuing exploration and scientific research while also providing protection of the cave environment. This activity most notably led to the discovery of the Snowy River passage and the designation of the NCA. Primitive trails inside the recreational portion of the cave also exist to minimize impacts to the cave. The cave has cultural links to indigenous and contemporary communities.
SCIENTIFIC	The Fort Stanton-Snowy River Cave is scientifically important on behalf of past research and continued scientific research, containing geomicrobiological, geological, mineralogical and	Geomicrobiological, geological, mineralogical and paleoclimatological resources within the cave include: <ul style="list-style-type: none"> 1. Biodiversity and mineral-precipitating capability of the unusual microbiological

	paleoclimatological resources.	<p>communities inhabiting abundant black manganese-rich crusts on walls and ceilings.</p> <ol style="list-style-type: none"> 2. Nature of branching microbial communities on mud deposits. 3. Potential for human use, e.g. pharmaceutical, industrial, or bioremediation. 4. Understanding of the cave in relation to regional geology and paleoclimatology.
ARCHAEOLOGICAL	The Fort Stanton-Snowy River Cave likely contains subsurface material that relates to historic, prehistoric or protohistoric use.	All historical objects are in an archaeological state. Due to the consistent historical flooding of Fort Stanton-Snowy River Cave, the entire interior floor surface at least from the main entrance through Conrad's Passage, Twenty Steps and Three Way Hill is likely to contain subsurface material that relates to historic, prehistoric or protohistoric periods.
NATURAL	The Fort Stanton-Snowy River Cave is minimally developed and contains significant geologic and biologic features, including unique plant and animal species.	Though the entire cave is generally free of human developments, the cave has two distinct regions: The front part of the Fort Stanton Cave which has minimal developments including trails, stabilizing reinforcements, and gates; and the Snowy River and associated passages which do not contain developments. The natural geologic and biologic features of both portions of the cave are the subject of scientific endeavors in geology, hydrology, wildlife biology, and microbiology. Several species of bats are known to hibernate in Fort Stanton Cave, and one of the largest known winter roosts of the Townsend's big-eared bat in New Mexico occurs here. Other organisms that inhabit the cave include extremophile microorganisms that may exist nowhere else in the world. These include a wide diversity of fungi,

		antibiotic-producing actinobacteria, and multiple strains of manganese-using bacteria that survive by chemically breaking down manganese compounds. The Snowy River formation (the white calcite floor deposit thought to be the largest continuous cave formation in the world), black manganese crusts, various forms of stalactite, stalagmite, and flow stone formations, pools, mud deposits, fossils, and scenic cave settings are geologic features that contribute to the natural wonder of the Fort Stanton Cave complex.
EDUCATIONAL	The Fort Stanton-Snowy River Cave provides important educational opportunities regarding scientific, historic, and archeological subjects.	Past and future discoveries of cave resources provide a wealth of opportunities for educational outreach. Subjects include geology, hydrology, microbiology, and archeology. Educational opportunities may be delivered to students and others entering portions of the cave suitable for visitation. Other educational opportunities are delivered off-site through text, video, and live presentations.

A. Purpose and Need for the Plan

In the Omnibus Public Land Management Act of 2009 (Public Law [PL] 111-11, March 30, 2009, see Appendix 4), Congress established the NCA in order to conserve, protect, and enhance the “historic, cultural, scientific, archaeological, natural, and educational subterranean cave resources of the Fort Stanton-Snowy River cave system.” The purpose of the Ft. Stanton-Snowy River Cave National Conservation Area Resource Management Plan (NCA Plan) is to provide the framework for managing the subsurface and surface resources of the NCA, incorporating previous management plans where applicable, taking into consideration any information developed in the studies of the land and resources within or adjacent to the NCA, and developing working relationships with the local communities of Lincoln County, New Mexico.

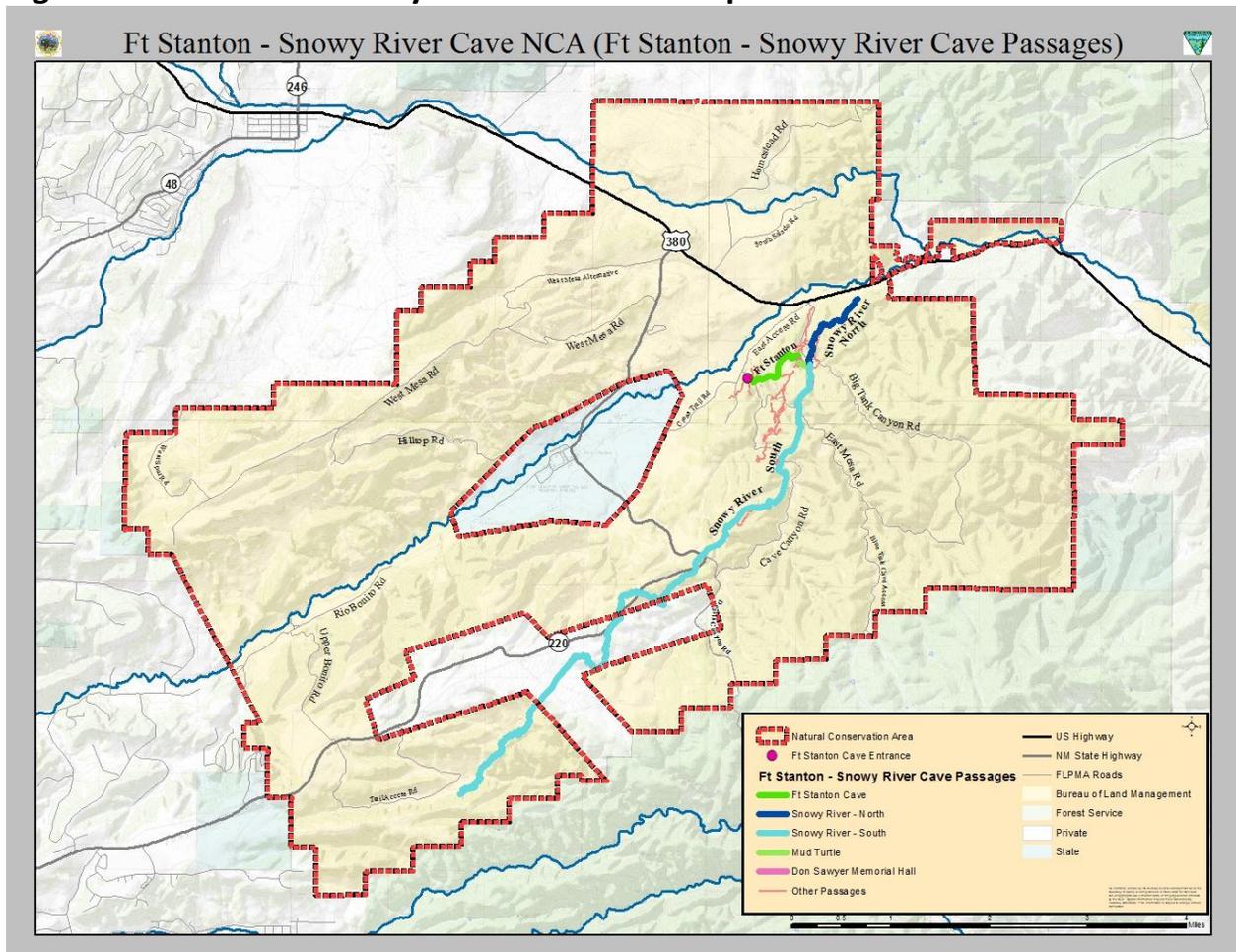
The need for this plan is to comply with PL 111-11, in which Congress mandated that the BLM develop a comprehensive plan to manage the NCA. PL 111-11 established the NCA to protect, conserve, and enhance the unique and nationally important historic, cultural, scientific, archaeological, natural, and educational subterranean cave resources of the Fort Stanton-Snowy

River cave system, and to meet the requirements of the Federal Land Policy and Management Act of 1970, as amended. Congress also provided that the surface resources of the NCA would be managed in accordance with the Fort Stanton Area of Critical Environmental Concern Final Activity Plan of 2001. To comply with the congressional directive, the BLM has prepared a Resource Management Plan Amendment (RMPA) and supporting Environmental Assessment for the NCA.

B. Planning Area

The NCA encompasses 24,876 acres (See Figure 1) of land in Lincoln County, New Mexico. Most of the NCA is comprised of the former Fort Stanton ACEC plus an additional 246 acres including the Rio Bonito Acquired Lands Tract 1 (166 acres) and grazing allotment 63071 (80 acre

Figure 1. Ft. Stanton-Snowy River Cave NCA Map



C. Scoping and Issues

The BLM RMP planning process is issue-driven. The identification of issues helps to resolve resource management problems and to take advantage of management opportunities. The

following section discusses the issues and management concerns that determined the alternatives and the scope of analysis for the Draft RMPA and supporting Environmental Assessment (EA). Planning issues are usually considered external to the BLM and express more wide-spread opportunities, conflicts, or problems associated with the management of public lands. Planning issues may also reflect new data, new or revised policies, and changes in resource uses. Management concerns are topics that involve a resource management activity or land use and often they are internal to the agency. While some concerns may have overlapping issues, a management concern is generally one identified by BLM staff, an individual or group.

In April 2010, the Roswell Field Office held two public meetings in the communities most directly affected by the NCA – one in Capitan, New Mexico and one in Ruidoso, New Mexico. A total of twenty-four people attended those meetings. The BLM received 13 letters and e-mails during the scoping period. Fourteen comments were received at these public meetings and 58 comments were received from letters and e-mails. The oral and written comments about Fort Stanton Cave and the Snowy River Passage included cave management in general, visitation limits, discovery and survey criteria, bat habitat and hibernaculum, air quality and water quality. Comments about surface management within the NCA included livestock grazing, development of a campground, trails, vegetation management, and management prescriptions for areas now included in the NCA that were not part of the Fort Stanton Area of Critical Environmental Concern.

Information was also sent to and comments were solicited from Comanche Nation, the Pueblo of Isleta, the Ysleta del Sur Pueblo, the Kiowa Tribe of Oklahoma, and the Mescalero Apache Tribe. A meeting between the BLM and the Mescalero Apache Tribal Historic Preservation Officer was conducted in August 2010. All the agencies and groups cited in Section VI of this document were invited to comment. The BLM also conducted internal scoping with an interdisciplinary team of resource specialists. Internal and external scoping efforts identified several issues and management concerns that should be considered in developing the NCA management plan. The issues and management concerns are summarized below, as well as issues that were considered but would not be addressed in the NCA plan.

i. ***Planning Decisions to be made in the NCA Plan***

- The protocol for continued scientific exploration of the Snowy River Passage
- Whether or not to allow recreational access to the Snowy River Passages
- Whether or not to drill a portal (entrance) into the cave and, if so, how to mitigate the impacts to other cave resources
- Whether or not to charge visitor use fees and which programs would charge those fees
- The criteria for re-establishing the Rio Bonito Campground or relocating the to a more appropriate location
- The criteria for future land acquisition adjacent to NCA
- Managing visual resources on the NCA
- Managing mineral material resources on the NCA

ii. ***Issues to be addressed in the NCA Plan***

- Livestock Grazing
 - How would conflicts between resource conservation and livestock grazing be addressed?
- Vegetation Management
 - How would conflicts between vegetation management, particularly use of prescribed fire and protecting cave resources be addressed?
- Land Use Authorizations
 - How would BLM manage new applications for Land Use Authorizations
- National Wild and Scenic River Systems (NWSR)
 - How would rivers eligible for inclusion in the NWSR be managed.

iii. ***Management Concerns to be addressed in the NCA Plan***

- Recreation
 - How would off-highway vehicle (OHV) uses on the NCA be managed to provide adequate public access while minimizing impacts to natural and cultural resources?
- Cultural Resources
 - How would the management plan address cultural resource management, while taking into account other uses?

iv. ***Issues Outside of Scope of the Plan***

The following issues will not be addressed in the NCA Plan as they are outside of the scope of the plan, or they are already addressed in existing policy or administration.

- Would the BLM repair and further develop the corrals area?
 - This issue was discussed during plan development and it was determined that this action can be completed outside the scope of the NCA plan, should the BLM decide to do so.
- Would the BLM develop Fort Stanton Cave to make it more accessible?
 - Making Fort Stanton Cave more accessible would be unfeasible. The entrance to the cave is too steep and narrow to allow for the proper construction of handicap access without drastically altering the formation, which would not be consistent with the purposes of the legislation that establishes the NCA.
- Would the BLM close Camp Sierra Blanca?
 - Camp Sierra Blanca is owned and managed by the State of New Mexico. The BLM does not have authority over its management.

- The name of the NCA is confusing and inaccurate. Will the BLM change it?
 - The Fort Stanton-Snowy River Cave NCA was named by an Act of Congress, PL 111-11. The BLM does not have the authority to change the name.
- Climate change
 - The BLM considered including an analysis of climate change and greenhouse gas emissions based on the alternatives within this plan. The BLM concluded that the proposed alternatives would result in negligible increase in emissions and negligible impacts to climate change. Therefore, climate change will not be addressed.

D. ***Planning Criteria/Legislative Constraints***

The BLM planning regulations (at 43 CFR 1610.4-2) require development of planning criteria to guide preparation of an RMP. *Planning criteria* are the standards, rules, and other guidelines developed by managers and interdisciplinary teams, with public input, for use in forming judgments about plan-level decision making, analysis, and data collection. These criteria are used to establish the parameters or “ground rules” for making planning decisions and simplifying RMP actions. The criteria may be adjusted during RMP development based on management concerns and the results of the public scoping process. Planning criteria for the Snowy River NCA Plan are as follows:

- The NCA Plan will comply with the Omnibus Public Land Management Act of 2009.
- While the multiple-use mandates of Federal Land Policy and Management Act (FLPMA) and all other applicable laws, regulations, and policies will be followed to the extent appropriate, the provisions of the Act will prevail in managing the NCA.
- Land use decisions in the NCA Plan will apply to the surface and subsurface estate managed by the BLM.
- For program-specific guidance for decisions at the land use planning level, the process will follow the BLM’s policies in the Land Use Planning Handbook, H-1601-1.
- Public participation and collaboration will be an integral part of the planning process.
- The BLM will strive to make decisions in the plan compatible with the existing plans and policies of adjacent local, state, and federal agencies and local American Indian tribes, as long as the decisions are consistent with the purposes, policies, and programs of federal law and regulations applicable to public lands.
- The NCA Plan will recognize valid existing rights.
- The NCA Plan will amend, where applicable, management decisions from existing planning documents.
- The NCA Plan will identify goals, objectives, and actions for the conservation and protection of cave resources. (See Appendix 4).
- The NCA Plan will identify Best Management Practices and mitigation measures to be applied when surveying, exploring, and conducting scientific studies within Fort Stanton Cave and the Snowy River Passages.
- The BLM will work cooperatively and collaboratively with cooperating agencies and all other interested groups, agencies, and individuals.

- The BLM and cooperating agencies will jointly develop alternatives for resolution of resource management issues and management concerns.
- The BLM will consider public welfare and safety when addressing hazardous materials and fire management.
- GIS and metadata information will meet Federal Geographic Data Committee (FGDC) standards, as required by Executive Order 12906. All other applicable BLM data standards will also be followed.
- The planning process will provide for ongoing consultation with American Indian tribal governments and strategies for protecting recognized traditional uses.
- Planning and management direction will focus on the relative values of resources and not the combination of uses that will give the greatest economic return or economic output.
- The BLM will consider the quantity and quality of non-commodity resource values.
- Where practicable and timely for the planning effort, the best available scientific information, research, and new technologies will be used.
- Actions must comply with all applicable regulations and must be reasonable, achievable, and allow for flexibility while supporting adaptive management principles.
- The Economic Profile System (EPS) will be used as one source of demographic and economic data for the planning process. EPS data will provide baseline data and contribute to estimates of existing and projected social and economic conditions.

E. ***Planning Process***

The NCA management planning process started with the development of a Preparation Plan. This plan outlines the steps to follow and the criteria to use when developing the NCA plan. The next step was the publishing of a Notice of Intent (NOI) in the *Federal Register* on March 9, 2009. This NOI notified the public that the BLM would amend the Roswell RMP to include the Fort Stanton-Snowy River Cave NCA plan.

The BLM then conducted scoping. During scoping, both external and internal comments were sought to identify issues and concerns related to the management plan. Alternatives for the NCA plan were formulated from these issues and concerns. After formulating the alternatives, the BLM analyzed the effects of the alternatives and prepared the Draft RMP Amendment/EA.

The BLM released the Draft RMP Amendment/EA for a 45-day public comment period. The comments were reviewed and addressed as necessary. The BLM made revisions based on public comment where appropriate and developed the Proposed RMP Amendment/EA. The Proposed RMP Amendment/EA will be released for a 30-day protest period and concurrent 60-day Governor's Consistency Review. After all protests have been resolved, the Record of Decision will be signed and the Approved NCA Plan will be available.

The Public review and comment period ended in June 2011. Appendix 6 (NCA Comments) identifies the substantive comments that the BLM received and the BLM's response. Comments that were in support of or non-support of particular aspects of the plan were not considered further unless justification associated with the analysis or rationale was included. Comments seeking corrections or edits were further analyzed and will be reflected in plan documents.

The following actions would require site-specific NEPA analysis.

- Development of New Campgrounds
- Imposition of fees
- Drilling of a cave portal
- ROWs
- Recreational access to Snowy River passage

F. *Conformance with Land Use Planning*

This plan will amend the RMP and Record of Decision (BLM 1997) to conform to PL 111-11. The NCA boundary established by this law will replace the Fort Stanton ACEC boundary established in the Roswell RMP. The NCA plan will carry forward appropriate surface management decisions from previous plans, as directed by PL 111-11 (Appendix 4), and will focus on sub-surface resource management of the Fort Stanton Cave system. The NCA Plan will also revise the 1988 Cave Management Plan for Fort Stanton Cave.

G. *Relationships to Statutes, Regulations, and Other Plans*

All alternatives considered in the NCA Plan are consistent with:

Omnibus Public Land Management Act of 2009 (PL 111-11 U.S.C.);
Federal Land Policy and Management Act of 1976 (43 U.S.C. 1700 et seq.);
National Environmental Policy Act of 1969 (42 U.S.C. 4321);
Taylor Grazing Act of 1934 (43 U.S.C. 315 et seq.);
Clean Water Act (33 U.S.C. 1251 et seq.), as amended;
Endangered Species Act (16 U.S.C. 1535 et seq.) as amended;
Executive Order 11988, Floodplain Management
Executive Order 11990, Protection of Wetlands;
Federal Lands Recreation Enhancement Act (PL 108-447 U.S.C.);
National Historic Preservation Act of 1966 (as amended); and
Federal Cave Resources Protection Act of 1988.

This EA is tiered to and/or incorporates by reference the following plans:

Cave Management Plan - Fort Stanton Cave (1988);
Roswell Resource Management Plan (1997);
Fort Stanton Area of Critical Environmental Concern Final Activity Plan (2001);
Fort Stanton Watershed Improvement Project Environmental Assessment (2001);
Fort Stanton Area of Critical Environmental Concern Route Designation Plan (2003);
Discovery and Documentation Procedures in Fort Stanton Cave National Natural
Landmark (2003);
Rio Bonito Acquired Lands (RBAL) Final Activity Plan (2004);
Resource Management Plan Amendment for Fire and Fuels Management on Public Land
in New Mexico and Texas (RMPA for Fire and Fuels) (2004); and
Capitan Area Grazing EA, (2010).

Pecos District Noxious and Invasive Weed Spot Treatment Environmental Assessment, DOI-BLM-NM-P010-2009-134, signed 3/1/2010.

The Roswell Field Office Saltcedar and Russian Olive Control/Eradication Environmental Assessment, NM-060-2004-159, signed 2/17/2005.

Cave and Abandoned Mine Closures Due to White Nose Syndrome Environmental Assessment, DOI-BLM-NM-P010-2011-16-EA, signed 11/4/2010.

II. ALTERNATIVES

A. *General Description of Alternatives*

This plan would adopt the goals and objectives of the 1997 Roswell RMP, the 2001 Fort Stanton ACEC Final Activity Plan, and the RBAL Final Activity Plan.

The No Action Alternative is how the area is currently being managed as prescribed in the current land use plans, including the 1997 Roswell RMP, the Fort Stanton ACEC Final Activity Plan, and the RBAL Final Activity Plan.

Alternative A is the Preferred Alternative and describes a balanced approach to managing the NCA. This alternative makes changes to the No Action Alternative as directed by PL 111-11 as appropriate (See Table 1 for comparisons).

Alternative B describes management prescriptions for Fort Stanton Cave and the Snowy River Passage that are more restrictive than those in the Preferred Alternative including limiting availability of recreation inside and outside of the caves and mineral materials.

Alternative C describes management prescriptions for Fort Stanton Cave and the Snowy River Passage that are less restrictive than those in the Preferred Alternative.

Table 2. Comparison of alternatives.

ISSUE/RESOURCE	NO ACTION ALTERNATIVE	ALTERNATIVE A (PREFERRED)	ALTERNATIVE B	ALTERNATIVE C
Mineral Resources	Open to the discretionary disposal of mineral materials, except for approximately 330 acres of the Feather Cave Complex.	Closed to commercial disposal of mineral materials but available for administrative use within the NCA	Closed to the disposal of mineral materials.	Same as the No Action Alternative.
Land Tenure	The BLM would consider acquiring water rights, private and state lands, including the Rio Bonito Waterfall, lands along the Rio Bonito adjacent to Fort Stanton, and the NMSU facilities at Fort Stanton. The BLM would consider leasing water rights.	BLM would consider acquisition of land and water rights to consolidate natural resource values and meet the management objectives of this plan. Properties would be acquired from willing sellers via exchange, purchase of land, easements, leases, and donation, or other comparable methods.		
Land Use Authorizations (ROW, Lease, Permits)	The BLM would continue to exclude major rights-of-way (ROWs) except a utility corridor already established for the Sierra Blanca Regional Airport. The BLM would consider minor ROWs, leases and permits(Page 21 in the RMP)	Same as No Action, plus all land use applications that include overhead structures with a height greater than 15 feet would be buried or prohibited, including small wind turbines. This would be done to reduce visual impacts on the NCA.		
Visual Resource Management Classes	The NCA manages Class II, III, and IV VRM areas.	All VRM areas currently managed at Class IV would be managed at Class III. Areas currently managed at Classes II and III will continue to be managed the same.		

Table 2. Comparison of alternatives (continued).

ISSUE/RESOURCE	NO ACTION ALTERNATIVE	ALTERNATIVE A (PREFERRED)	ALTERNATIVE B	ALTERNATIVE C
Fees for use of Fort Stanton-Snowy River Cave NCA	No fees are charged for any use of the NCA.	Fees would be considered for the use of designated developed campgrounds upon completion of a business plan.	Same as Alternative A plus a fee would be charged for cave permits upon completion of a business plan.	Same as No Action Alternative.
Wild and Scenic Rivers	No rivers in the NCA are designated under the National Wild and Scenic Rivers System (NWSRS). <i>Segment 1 of the Rio Bonito (3.49 miles) was found to be eligible for inclusion in the NWSRS. The values which contribute to its eligibility for inclusion in the NWSRS would be protected until a suitability determination could be made.</i>	The BLM would not recommend any rivers to be designated as part of the NWSRS.	The BLM would recommend that Segment 1 of the Rio Bonito, (see map) be included in the NWSRS as a Scenic River.	Same as Alternative A.
Rio Bonito Campground	Rio Bonito Campground is closed due to its location within a riparian zone.	The Rio Bonito Campground would be re-established if road access is suitable for two-wheel drive vehicles; a suitable location more than 100 feet from the riparian area can be provided; and impacts to cultural resources can be avoided.	Same as No Action Alternative.	Same as Alternative A.

Table 2. Comparison of alternatives (continued).

ISSUE/RESOURCE	NO ACTION ALTERNATIVE	ALTERNATIVE A (PREFERRED)	ALTERNATIVE B	ALTERNATIVE C
Motorized OHV Route Designation	Motorized OHV users are limited to designated roads and trails	Motorized OHV users would be limited to designated roads.		
Fort Stanton Cave visitation limits	Ten people allowed in the front portion of Fort Stanton Cave, six people beyond Hell Hole Gate.	A range of three to ten in the front portion of Fort Stanton Cave, a range of three to six including a BLM-approved guide beyond Hell Hole Gate (exception to this rule would be addressed in each cave permit). See Appendix 3.		
Cave permits issued for commercial use	Up to 20% of 398 recreational cave permits available could be issued for commercial use.	Same as the No Action Alternative.	Up to 10% of the 398 recreational cave permits could be issued for commercial use.	Up to 30% of the 398 recreational cave permits could be issued for commercial use.
Recreational access to Snowy River Passage	No recreational access to Snowy River Passage.	Same as the No Action Alternative.	Same as the No Action Alternative.	Recreational access would be allowed under certain defined conditions. See Appendix 3.
Portals for cave access	No portals will be drilled.	Portals would be considered using defined criteria; see Appendix 2. After a site specific analysis has been completed.	Same as the No Action Alternative.	Portals would be considered using defined criteria; see Appendix 2.

B. *Alternatives Considered but Not Analyzed in Detail*

i. *No Livestock Grazing*

This issue has been previously analyzed in several documents. Congress has provided that surface management of the NCA would be managed in accordance with the Fort Stanton ACEC Final Activity Plan of 2001. This plan and the Rio Bonito Acquired Lands (RBAL) Plan include a provision to use livestock grazing as a vegetation management tool. Further, no livestock grazing would be authorized under the Taylor Grazing Act, with the exception of grazing allotment #63071 Lamay Place. Since this issue has been analyzed previously under the National Environmental Policy Act (NEPA) process, further analysis is not necessary.

ii. *Wild Horses and Burro Refuge*

During the scoping period, the BLM was asked to consider using the NCA as a refuge for wild horses and burros. Title 16, USC Chapter 30, § 1339, Limitations of Authority, states: “Nothing in this chapter shall be construed to authorize the Secretary to relocate wild free-roaming horses or burros to areas of the public lands where they do not presently exist”.

iii. *Wilderness Characteristics*

In preparation for this NCA plan, the BLM updated the wilderness inventory for the NCA. Upon completion of the inventory, the BLM determined that no portion of the NCA has wilderness characteristics because there are no areas within the NCA that meet the 5,000 acre minimum size requirement, nor are there any areas that are adjacent to existing wilderness or wilderness study areas (WSAs). The NCA is segmented by roads that meet the definition of a road under the Federal Land Policy and Management Act (FLPMA). Therefore, there are no areas within the NCA that contain wilderness characteristics. The results of the inventory are included in the permanent Administrative Record for the NCA plan.

C. *Management Common to All Alternatives*

Several decisions from previous management plans pertinent to the Fort Stanton-Snowy River Cave National Conservation Area would be carried forward in this plan, in accordance with PL 111-11, Sec 2203(c). The relevant plans that contain these decisions are the 1997 Roswell Resource Management Plan (RMP), the 2001 Fort Stanton Area of Critical Environmental Concern Activity Plan (ACEC Plan), the 2001 Fort Stanton Watershed Improvement Project (WIP), the 2003 Fort Stanton ACEC Route Designation Plan (Route Plan), the 2004 Rio Bonito Acquired Lands Final Activity Plan (RBAL), the 2004 RMP Amendment for Fire and Fuels Management on Public Land in New Mexico and Texas (Fire RMPA), and the 2010 Capitan Area Grazing Environmental Assessment (Grazing EA). The decisions brought forward from these plans are outlined below. These decisions carry through all alternatives and have undergone NEPA analyses in previous documents. Resource conditions within the NCA have not changed substantially since these documents have been approved. In the following statements, the term NCA has replaced the term ACEC found in current planning documents.

Also in accordance with PL 111-11, Sec 2203(c), the BLM would consider entering into a cooperative agreement with Lincoln County, New Mexico concerning the interpretation and protection of the resources in the NCA.

i. ***Livestock Management***

Livestock grazing would be considered to the extent it would be used as a tool to accomplish management plan objectives. Livestock grazing would be limited or excluded in riparian pastures, highly erodible areas, cave entrances, campgrounds and day-use areas, and sensitive archaeological sites. No grazing preference would be established. When livestock grazing is used as a tool, the BLM would control the number of animals and timing of grazing within the NCA (RMP).

When using grazing as a tool in riparian areas, grazing would occur only under favorable forage conditions. Cooperative agreements would be developed between the BLM and the authorized grazer so that the use of the land can best benefit all parties and can be developed to its full potential. Pasture fences are present within the rest of the NCA in the event that livestock would be used as a vegetation management tool (ACEC Plan).

Grazing in allotment No. 63071, Lamay Place is authorized under Section 15 of the Taylor Grazing Act. It is currently authorized for cattle, 2 animal units and 15 animal unit months (Grazing EA). The 1997 Roswell RMP identified this allotment as suitable for grazing. A fence currently separates the allotment from the rest of the NCA which would prevent any unauthorized movement of livestock onto the NCA.

ii. ***Vegetation and Watershed Management***

The goal of vegetation management is to manage resources to maintain or improve vegetation in order to attain the desired plant community (DPC) as outlined in the Roswell RMP. The goal of watershed management is to improve watershed function to enhance water quality and water availability. The BLM would manage the vegetation resources within the NCA contributing to the overall health and function of the watershed while considering balanced resource sustainability. Best Management Practices (BMPs), such as erosion control structures, will be used to minimize sedimentation as a cause of nonpoint source pollution in surface waters. Vegetation management on the NCA will be developed under specific Ecological Range Site goals which will include agricultural crops established on existing tilled acreage using water rights obtained with the acreage (ACEC Plan).

To meet this goal, projects would include mechanical treatment, herbicidal treatment, prescribed fire, and livestock grazing (WIP, ACEC Plan). Prescribed burns would be conducted in selected pinion-juniper, riparian and grassland community types in the NCA to improve wildlife habitat and reduce fuels (Fire RMPA).

Saltcedar, Russian Olive, and Siberian Elm treatments of selected riparian/wetland habitat along the Rio Bonito and Salado Creek would be conducted using prescribed fire, mechanical control, or chemicals (RMP, ACEC Plan, WIP).

Management includes protecting existing public land water supplies and water resources, which include state appropriative water rights, such as surface water rights and groundwater rights.

iii. ***Cultural Resources Management***

The Feather Cave Archaeological Complex, including Lower Stanton Pueblo Ruin and Feather Cave, Agogino Annex cave, Agogino Cave, Beth's Cave, Blue Tick Cave, and Fly Cave would all be managed to preserve, protect, and interpret unique archaeological values, artifacts, and architectural features (RMP, ACEC Plan).

Within the NCA, the management of Feather Cave, a site listed on the National Register of Historic Places, would emphasize off-site interpretation of its religious significance while allowing for the protection of fragile cultural values. The cave is closed to recreational use. The Feather Cave display has been developed and can be viewed by the public at the Lincoln State Monument Museum of New Mexico on US Highway 380 in Lincoln, New Mexico (ACEC Plan). Feather Cave interpretation is also addressed in the Fort Stanton State Monument Museum/Visitor Center.

An off-site interpretive display depicting Lower Stanton Pueblo Ruin would be developed. Development would occur after sufficient data recovery and analysis has been completed (ACEC Plan).

Additional research and on-site archeological surveys would be conducted on Tract 1 of the RBAL. Sites eligible for listing on the National Registry of Historic Places would be allocated into different cultural use allocations using established criteria as appropriate. The management goals would be to interpret some cultural sites for the public, research some of the sites for the information they contain, and to conserve those sites that meet the criteria for conservation (RBAL).

A separate cultural management plan will be developed for the NCA, incorporating elements of existing plans that are in various stages of development. This plan will be taking into consideration the various types of archaeological sites at Fort Stanton, the need to protect those sites and the public's use of Fort Stanton (ACEC Plan).

iv. ***Realty – Land Use Authorizations***

The NCA would continue to be designated as exclusion of rights-of-way for major projects such as high voltage electric transmission lines; pipelines 10 inches in diameter or larger; overhead structures with a height greater than 15 feet, communication sites for commercial use; federal, state and interstate highways; major county and private roads; and commercial wind and solar energy generating sites.

In accordance with Section 507 of the Federal Land Policy and Management Act of 1976 (90 Stat. 2781, 43 U.S.C. 1767) as amended, the following rights-of-way will continue to be retained in Federal ownership under all alternatives:

1. A 40 ft. X 40 ft. site surrounding a pump jack equipped water well, commonly known as the Airport Mesa Well, located on the NW¼NE¼SW¼ of section 11, Township 10

South, Range 14 East, containing 0.037 acres more or less. Further, the United States of America reserves and declares water rights to said water as set out in the Declaration of Owner of Underground Water Right, Declaration H-1873 dated April 9, 1984, on file in the office of the New Mexico State Engineer for the Hondo Basin.

2. A 10 ft. wide pipeline right-of-way approximately 2900 ft. long located in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 10 and the N $\frac{1}{2}$ N $\frac{1}{2}$ SW $\frac{1}{4}$ of Section 11, Township 10 South Range 14 East, containing 0.666 acres more or less.
3. A 10 ft. wide pipeline right-of-way approximately 400 ft. long located in the NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 11, Township 10 South, Range 14 East, containing 0.092 acres more or less.
4. A 30 ft. wide access road right-of-way approximately 2300 feet long for Lincoln County Road B-006 located in the S $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$, and the NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 11 and the NE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 10, Township 10 South, Range 14 East, containing 1.584 acres more or less.
5. A 30 ft. wide access road right-of-way approximately 600 ft. long for an existing two track road to the Airport Mesa Well from the point it leaves Lincoln County Road B-006 in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 11, Township 10 South, Range 14 East, and through the SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ and the NW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 11, Township 10 South, Range 14 East, containing 0.413 acres more or less.
6. A 30 ft. wide access road right-of-way approximately 1600 ft. long for an existing two track ranch road located in the S $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$, the NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 5 and the NE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 6, Township 10 South, Range 15 East, containing 1.102 acres more or less.
7. A 10 ft. wide utility right of way, for future electrical service, approximately 2900 ft. long and is included within the southern side of the access easement as mentioned in No. 1 of this listing containing 0.666 acres more or less.

The above subject right-of-way reservation is in the following described real property situated in the County of Lincoln State of New Mexico as follows:

New Mexico Principal Meridian

- T. 10 S., R. 14 E.,
Sec. 10, NE $\frac{1}{4}$ SE $\frac{1}{4}$;
Sec. 11, S $\frac{1}{2}$ NW $\frac{1}{4}$ and N $\frac{1}{2}$ SW $\frac{1}{4}$.

New Mexico Principal Meridian

- T. 10 S., R. 15 E.,
Sec. 05, SE $\frac{1}{4}$ NW $\frac{1}{4}$ and NW $\frac{1}{4}$ SW $\frac{1}{4}$;
Sec. 06, NE $\frac{1}{4}$ SE $\frac{1}{4}$.

The BLM would consider granting minor rights-of-way, leases and permits on a case by case basis. The NCA would be closed to leases issued under the authority of Recreation and Public Purposes Act (R&PP) (RMP, ACEC Plan, Travel Management – Trails).

Between 1997, when the Roswell RMP went into effect, and 2009, when Congress established the NCA, the BLM completed and implemented the Fort Stanton ACEC Route Designation Plan. As a result, there are now 93 miles of multiple use trails designated within the former ACEC. These trails are designated for non-motorized uses (hiking, equestrian, and mountain bikes) (ACEC Plan, Route Plan).

v. *Recreation Management*

Cross-country horse and foot travel is allowed in the NCA. Mountain bikers are encouraged to stay on established trails to protect riders and the landscape. The trails are all closed to motorized OHV use, except where they overlap with the 20 miles of designated roads. All roads and trails are marked with signs stating open or closed and delineate permissible access, whether by foot, horseback, mountain bike or vehicle. See the Fort Stanton ACEC Route Designation Plan for further information.

The NCA is open to overnight camping with a 14-day maximum length of stay.

The Fort Stanton ACEC and the RBAL were both designated as Special Recreation Management Areas in the 1997 Roswell RMP. These designations will carry forward with the NCA.

In order to support recreation, the BLM would consider developing a trail from the Apple Orchard to Salazar Canyon on the portion of the NCA that was Tract 1 of the RBAL. This trail would be designated for non-motorized uses (hiking, equestrian, or mountain bikes) (RBAL).

vi. *Travel Management – Off-Highway Vehicles*

To clarify the intent of the 1997 Roswell RMP and 2001 Fort Stanton ACEC Activity Plan, within the NCA, motorized cross-country travel will be allowed for any fire, search and rescue, or law enforcement vehicle used for emergency purposes. (Route Plan)

Access for disabled persons will be allowed per the Rehabilitation Act of 1973. Under the Act, an individual with a disability will not, solely by reason of his or her disability, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity conducted by BLM. Disabled access per the Rehabilitation Act is considered at the local level on a case-by-case basis. Motorized wheelchairs, as defined in the Rehabilitation Act are not considered OHVs and would not be restricted by any of the alternatives.

The New Mexico Department of Game and Fish is the licensing authority for all hunting and fishing within the NCA, including hunting by people with disabilities. Disabled hunters may be accompanied by a person who is not disabled to assist them with the retrieval of harvested game animals. Disabled hunters are not permitted to use OHVs for game retrieval.

There will be no exceptions that allow for cross-country travel for game retrieval on the NCA. Hunters should consider this cross-country restriction prior to engaging in hunting activities on the NCA.

Motorized cross-country travel for lessees and permittees will be limited to the administration of a BLM lease or permit. Persons or corporations having such a permit or lease will be able to perform administrative functions on public land within the scope of the permit or lease. Lessees and permittees will not be allowed to drive cross-country for the purposes of hunting, fishing, recreation or other purposes not directly related to the administration of their Federal permit or lease.

The constraints mentioned above, however, will not preclude modifying permits or leases to limit motorized cross-country travel during further site-specific analysis to meet resource management objectives or standards and guidelines.

Some examples of administrative functions include, but are not limited to:

- Gas or electric utilities monitoring a line for safety conditions or normal maintenance.
- Accessing a remote communications site for normal maintenance or repair.
- Livestock permittees checking vegetative conditions, building or maintaining fences, delivering salt and supplements, moving livestock, checking wells or pipelines as part of the implementation of a grazing permit or lease,
- Events that are not compatible with the NCA management objectives include, but are not limited to, motor vehicle events such as off-road racing or motorcycle trials.

vii. ***Recreation Management – Dispersed Camping***

“Vehicle campers” may drive no more than 100 feet off a BLM-designated road or trail to a campsite. Camping would not be allowed within 100 feet of the Rio Bonito and Salado Creek and no closer than 300 yards of any seeps or springs, man-made water hole, water well or watering tank used by wildlife or domestic livestock. Camping would be no closer than one-quarter mile from waysides, overlooks, interpretive trails or state highways, except at developed campgrounds and designated campsites (RMP, ACEC Plan).

The BLM would continue to monitor the impacts of camping on the resources within the NCA. The Fort Stanton Cave Road would continue to be closed to dispersed camping from its junction with US Highway 380 to the entrance of Fort Stanton Cave (RMP, ACEC Plan).

viii. ***Recreation Management – Special Recreation Use***

The BLM would consider granting special recreation use permits for events that are compatible with the continued and future uses of the NCA. In reviewing the applications for these permits, the BLM would cooperate with the applicant to identify locations where special events would minimally impact resources within the NCA. The BLM would continue to monitor the impacts of those events on the resources within the NCA (ACEC Plan).

ix. ***Visual Resource Management***

The goal of visual resource management on the NCA is to maintain and enhance the current viewsheds. A visual resource inventory has been completed for the ACEC, now NCA, and the

inventory remains current. Based on that inventory there are 9,533 acres of VRM Class II and the 10,367 acres of Class III VRM would not be modified in the NCA Plan (RMP).

x. ***Wildfire Management***

The NCA is designated by the RMPA for Fire and Fuels as Category B under the Fire Management Categories. Category B applies to areas where unplanned wildfire is not desired because of current conditions. These are ecosystems where an unplanned ignition could have negative effects unless/until some form of mitigation takes place (Fire RMPA).

The use of bulldozers to create fire lines will be prohibited on the NCA due to the presence of the endangered Kuenzler's hedgehog cactus, the high level of outstanding cultural resources, and the presence of cave passages close to the surface (ACEC Plan).

xi. ***Cave Management***

Fort Stanton Cave and all other caves that contain hibernating bats would be closed annually to recreation use from November 1 to the following April 15, to protect hibernating bat populations. The BLM would protect the caves from impacts caused by grazing, road construction, changes to streams that feed caves such as Fort Stanton Cave, construction of new facilities along the Rio Bonito; and pollution such as sewage, phosphates or chemicals. The goal of such protection measures is maintaining the natural and biotic values of caves within the NCA (RMP, ACEC Plan).

Discovery and documentation will follow the protocol set forth in Discovery and Documentation Procedures in Fort Stanton Cave National Natural Landmark (2003), EA No. NM-060-2003-113 (see Appendix 1, 3, 5).

xii. ***Minerals***

In addition to the above decisions, under all alternatives the NCA has been withdrawn from mining laws, and mineral and geothermal leasing laws, as decreed by PL 111-11.

xiii. ***Water Resource Management – Surface Water and Groundwater***

Current surface water and groundwater quantity and quality management strategies in the NCA would remain unchanged. See the 1997 Roswell RMP. This includes management actions which increase water availability by enhancing annual water yields, in-stream flows, and discharge from springs, while also reducing resource damage by floods and accelerated erosion.

BLM would consider acquiring or leasing water rights to maintain or protect BLM water supplies, water resources, instream flows, and groundwater levels sufficient to support cave biota habitat, aquatic fish and wildlife resources, and riparian and wetland habitats.

D. ***No Action Alternative***

In the No Action Alternative, the BLM would manage the NCA using the previous management decisions outlined in Section H. above and the other decisions outlined in the existing land use

plans mentioned. These prescriptions are summarized below and in Table 1 Comparison of Alternatives.

i. ***Minerals***

All public lands in the NCA would remain open to the commercial disposal of mineral materials, except for approximately 330 acres in the Feather Cave Archaeological Complex. All public lands in the NCA would remain withdrawn from the general mining laws, and closed to the disposal of leasable minerals including oil and gas.

ii. ***Land Tenure***

The BLM would consider acquiring private and state lands and water rights, including the Rio Bonito Waterfall, lands along the Rio Bonito adjacent to Fort Stanton, and the New Mexico State University facilities at Fort Stanton.

iii. ***Visual Resource Management (VRM)***

No changes in VRM designations would be considered. Currently, the BLM manages 9,553 acres as VRM Class II, 10,367 acres as VRM Class III, and 4,972 acres as VRM Class IV. (See Map)

iv. ***Recreation***

No fees would be charged for general use of the NCA. Special Recreation Permit applications for organized groups, competitive events, and commercial activities would continue to consider on a case-by-case basis and the national permit fee schedule would apply. Motorized OHV users would be limited to designated roads and trails. Currently, no trails are designated for use by OHVs. The Rio Bonito Campground would remain closed due to its location within a riparian zone.

v. ***Wild and Scenic Rivers***

No rivers or river segments within the NCA are designated as part of the National Wild and Scenic Rivers System (NWSRS).

vi. ***Cave Management***

Caves within the NCA would be managed according to current cave management plans. Recreational cave permit limitations include: up to 20 percent of the recreational cave permits would be issued for commercial use; up to 10 people per permit would be allowed in the front portion of Fort Stanton Cave and no more than six people per permit would be allowed in the back portion of Fort Stanton Cave beyond the Hell Hole gate; and there would be no recreational access to the Snowy River Passage of Fort Stanton Cave.

Seven miles of passages within FSC, except Snowy River Passage, are normally open annually for recreational caving by permit from April 15 to November 1. FSC is closed from November 2 to April 14 to protect hibernating bat populations. Currently FSC is closed to recreational caving to prevent the possible spread of white-nose syndrome. See discussion below.

Feather Cave is closed to all visitor use, except for administrative or research purposes, to protect the significant bat roost, and to protect visitors from extreme safety hazards associated with breakdown, vertical entrances and histoplasmosis.

E. *Alternative A, Preferred Alternative*

In Alternative A, the Preferred Alternative, the BLM would manage the NCA using the previous management decisions outlined in Section B above as well as the No Action Alternative except where changed by the prescriptions outlined below. These prescriptions would take effect following the completion of this plan and would continue indefinitely unless amended or revised. These prescriptions are outlined in Table 1 Comparison of Alternatives.

i. *Minerals*

All public lands in Fort Stanton NCA will be closed to commercial disposal of mineral materials. The NCA would remain open to the disposal of mineral materials for administrative use only.

ii. *Land Tenure*

There would be a priority on acquisition of lands within the NCA boundary that are currently owned by the State of New Mexico. Where acquisition of non-federal lands would directly protect, conserve, or enhance the Fort Stanton Cave and Snowy River formation, acquisition of lands or interest in lands outside the NCA may occur. The BLM would consider acquisitions to meet the management objectives of this plan. Lands would be acquired only from willing sellers via exchange, purchase of land, easements, donation, or other comparable methods. Any acquired lands within the NCA boundary would be managed according to the prescriptions of this plan. Lands or interests in lands, acquired outside the NCA boundary would be managed according to the Roswell RMP.

iii. *Land Use Authorizations*

The BLM would consider granting minor rights-of-way, leases and permits. Due to potential visual impacts all land use applications that include overhead structures with a height greater than 15 feet would be buried or prohibited, including small wind turbines.

iv. *Visual Resource Management*

All Visual Resources currently managed under VRM Class IV would be managed under VRM Class III. All Visual Resources currently managed under Class II and III would remain the same. This would result in 9,553 acres managed as VRM Class II and 15,339 acres managed as VRM Class III.

v. *Recreation*

The BLM would institute fees for designated developed campgrounds under the following conditions:

1. A campground business plan would be developed in compliance with the Federal Lands Recreation Enhancement Act of 2005 (FLREA).

2. Fees would be dependent on the degree of campground improvements, including restroom facilities, shelters, trash collection stations, water, electric, additional parking; the amount of visitor use and maintenance costs for the campground.

The BLM would consider re-establishing a campground in the Upper Rio Bonito Canyon if suitable access can be provided; a suitable location more than 100 feet from the riparian area can be provided; and impacts to cultural resources can be avoided. OHV use would be limited to designated roads.

The BLM would continue to limit the number of visitors to Fort Stanton Cave through the use of cave permits. The range of visitors to the front portion of Fort Stanton Cave would be no fewer than three and no more than ten per permit. The number of visitors to the portion of the cave beyond Hell Hole Gate would be no fewer than three and no more than six per permit. All visitors allowed past Hell Hole Gate will include a BLM-approved guide. See Appendix 3, Implementation, for a description of the process to determine the number of visitors.

As in the No Action Alternative, up to 20 percent of the 398 available recreational cave permits could be issued for commercial use.

vi. ***Wild and Scenic Rivers***

The BLM would not recommend any rivers or river segments within the NCA to be designated as part of the NWSRS.

vii. ***Cave Management***

Appendices 1, 3,5,6,7 and 8 explain how the cave will be managed. Science and survey expeditions under administrative permits may exceed these limits. Appendices for cave management were developed from Fort Stanton Cave National Natural Landmark Environmental Assessment NM-060-2003-113.

There would be no recreational access to the Snowy River Passage of Fort Stanton Cave.

viii. ***Cave Portal Protocol***

The BLM would consider constructing portals for access to the Snowy River Passage using the criteria in Appendix 2, Criteria for Drilling a Portal to Access Snowy River. The construction of a cave portal would allow for year-round access into Snowy River Passage. See Appendix 2 for further information.

F. ***Alternative B***

In Alternative B the BLM would manage the NCA using the previous management decisions outlined in Section B above as well as the No Action Alternative except where changed by the prescriptions outlined below. These prescriptions would take effect following the completion of this plan and would continue indefinitely unless amended or revised. These prescriptions are outlined in Table 1 Comparison of Alternatives.

i. **Minerals**

The NCA would be closed to commercial disposal of mineral materials, including administrative use within the NCA.

ii. **Land Tenure**

Same as Alternative A.

iii. **Land Use Authorizations**

Same as Alternative A.

iv. **Visual Resource Management**

Same as Alternative A.

v. **Recreation**

The BLM would institute use fees for designated developed campgrounds under certain conditions, as in Alternative A. OHV use would be limited to designated roads as in Alternative A. The Rio Bonito Campground would remain closed due to its location within a riparian zone.

vi. **Wild and Scenic Rivers**

The BLM would recommend that Segment 1 of the Rio Bonito, as inventoried, be identified as part of the NWSRS, with a tentative classification of Scenic River Area.

vii. **Cave Management**

The range of visitors per permit would be the same as in Alternative A. Up to 10 percent of the 398 available recreational cave permits could be issued for commercial use. BLM would also institute fees for recreational cave permits under the following conditions:

1. A business plan would be developed in compliance with the Federal Lands Recreation Enhancement Act of 2005 (FLREA).
2. Fees would be based on an increase in visitor use of the cave as well as maintenance costs within the cave.
3. There would be no recreational access to the Snowy River Passage of Fort Stanton Cave as in the No Action Alternative and Alternative A.

viii. **Cave Portal Protocol**

The BLM would not consider constructing a portal to access the Snowy River Passage.

G. **Alternative C**

In Alternative C, the BLM would manage the NCA using the previous management decisions outlined in Section B above as well as the No Action Alternative except where changed by the prescriptions outlined below. These prescriptions would take effect following the completion of

this plan and would continue indefinitely unless amended or revised. These prescriptions are outlined in Table 1 Comparison of Alternatives.

i. ***Minerals***

Same as the No Action Alternative.

ii. ***Land Tenure***

Same as Alternative A.

iii. ***Land Use Authorization***

Same as Alternative A.

iv. ***Visual Resource Management***

Same as Alternative A.

v. ***Recreation***

As in the No Action Alternative, no fees would be charged for the use of the NCA. BLM would consider re-establishing a campground in the Upper Rio Bonito Canyon under the same conditions discussed in Alternative A. OHV use would be limited to designated roads as in Alternative A.

vi. ***Wild and Scenic Rivers***

The BLM would not recommend any rivers or river segments within the NCA to be designated as part of the NWSRS.

vii. ***Cave Management***

The range of visitors per permit would be the same as in Alternative A. Up to 30 percent of the 398 available recreational cave permits could be issued for commercial use. The BLM would consider recreational access to the Snowy River Passage of Fort Stanton Cave under the conditions described in Appendix 3, Implementation and completion of further environmental analysis.

viii. ***Cave Portal Protocol***

The BLM would consider constructing portals for access to the Snowy River Passage using the criteria in Appendix 2, Criteria for Drilling a Portal to Access Snowy River. The construction of a cave portal would allow for year-round access into Snowy River Passage. See Appendix 2 for further information.

III. AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

A. *Introduction*

This chapter discusses the environment affected by plan implementation and analyzes environmental effects by alternative on the objects of the NCA, Cave resources, and the Fort Stanton-Snowy River Cave system. This analysis will discuss both the direct and indirect effects. Direct effects are those effects which are caused by the action and occur at the same time and place. Indirect effects are those effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

Some information is unavailable at the time this plan is being written. The length of the Snowy River Passage is not known. Also, the source of the water that floods the Snowy River Passage is unknown.

Certain analytical assumptions were made during the writing of this NCA plan. It is assumed that the population of Lincoln County will continue to grow since it has grown throughout the last thirty years (see Section II. T. Socio-Economics). It is also assumed that as population grows the demand for public recreation will continue to increase. Another assumption is that scientific exploration of the Snowy River Passage will continue.

B. *General Setting*

In 1992, the BLM acquired lands along the Rio Bonito in the vicinity of Lincoln, New Mexico in order to provide for public recreation and protection of stream and riparian resources. One of those parcels, known as "Tract 1" is contiguous with the ACEC. An 80 acre parcel of BLM land managed under a grazing allotment also existed adjacent to the ACEC. In the Omnibus Public Land Management Act of 2009, Congress established the Fort Stanton-Snowy River Cave National Conservation Area NCA Tract 1, and the 80-acre grazing allotment to form the NCA.

Though not under the administration of BLM, the State of New Mexico lands and the Sierra Blanca Airport are also within the boundaries of the NCA. The NCA completely surrounds the Fort Stanton State Monument, administered by the State of New Mexico. The BLM works closely with the State to facilitate visitation in the area.

Fort Stanton Cave (FSC) is the largest known cave within the NCA, and the BLM and is the third longest cave in New Mexico. During the April 27 – May 5, 2013 Fort Stanton Cave Study Project Expedition, the cave length increased from 20.59 miles at expedition start to 23.87 miles at the end. This took Fort Stanton Cave from 31st longest cave in the U.S. to 21st longest in one week! (Carlsbad Caverns is 19th on the list). In the world, the cave went from 130th to 89th place! Potentially, as more cave passage is surveyed, Fort Stanton Cave could surpass the length of Carlsbad Caverns and become the second largest cave in New Mexico. At 17.16 miles in length, the Snowy River Passage is the longest singular cave passage in the world. Further, the white calcite floor deposit is considered the longest contiguous cave formation in the world. Of the 23.87 miles of passage, there is now a little over 6000 feet (1.14 miles) of passage that is under the Smokey Bear District of the Lincoln National Forest, and thus the cave will now be managed in partnership by two federal agencies.

Other smaller caves and blow holes exist within the area. FSC is widely known for its rare velvet formations, and there are also interesting helictites, aragonite, selenite needles, and various forms of gypsum. Seven miles of "traditional" passages within FSC, except Snowy River Passage,

are normally open annually for recreational caving by permit from April 15 to November 1. FSC is closed from November 2 to April 14 to protect hibernating bat populations. Currently FSC is closed to recreational caving to prevent the possible spread of white-nose syndrome. See discussion below.

Feather Cave is closed to all visitor use, except for administrative or research purposes, to protect the significant bat roost, and to protect visitors from extreme safety hazards associated with breakdown, vertical entrances, and histoplasmosis.

The possibility exists that Native Americans explored Fort Stanton Cave and could have used the cave as a water resource, for mineral extraction, or for ritual use. Accounts of early exploration by soldiers stationed at Fort Stanton indicate finding petrified hearths and fire brands in 1856. These accounts indicate Native Americans ventured at least one-half mile inside the main corridor. In 1855, a patrol of Company K, 1st Regiment, U.S. Dragoons (later 1st Regt, U.S. Cavalry) from the newly established Fort Stanton made the first recorded visit to the cave, as evidenced by researched and confirmed names and dates engraved on flowstone in the Lunchroom of the Upper Breakdown Passage.

The first known formal exploration of FSC was in 1877, when the Wheeler Expedition, part of the Surveys of the Territories (Wheeler, Hayden, Powell), discovered Hell Hole and the Lower Breakdown Passage. The group completed one of the first instrument surveys of a cave in the United States and left their names inscribed in Wheeler Hall, over one mile into the cave. Visits were probably fairly regular by soldiers and townspeople but very few letters or diaries have surfaced indicating amounts of visitation. The Great Divide Expedition of 1891, sponsored by a Denver-based periodical of the same name, chronicled the adventures of three members of the 10th Infantry Band from Fort Stanton in a vivid, if somewhat inaccurate, account for its readers. In 1908, the Chief of Engineers Office made another instrument survey of the cave. Except for minor discoveries, the known cave remained that which the Wheeler Expedition had discovered.

The contemporary period of cave exploration began in 1956, as cavers breached Three-Way Hill, discovered the Keyhole and the large, well-decorated passages beyond, bringing total passage length to just under eight miles. In 1969, the next major discovery was made, the one-half mile long Lincoln Cavern. The Snowy River Passage of FSC was discovered in September 2001 and within 11 years that one significant discovery extended the known cave length to almost 20 miles.

The Snowy River Passage was discovered by cavers investigating strong air flows coming through breakdown in the cave. Snowy River was named by the discovering party of four cavers due to a bright white crystal calcite formation covering, or serving as the Passage floor. Snowy River also includes several other passages branching off that do not have the white calcite deposit but resemble the main portion of Fort Stanton Cave. By May of 2013, nearly 24 miles of passage in the cave had been mapped, with the Snowy River Passage alone at 17.16 miles, including about 6,000 feet under, or into, Smokey Bear District, Lincoln National Forest-managed public land.

The original route into Snowy River Passage (Priority 7) was dug over a 30-year period, following very strong airflow. This passage proved to be very hazardous with several instances when cavers became temporarily stuck due to passage slumping. The average size of Priority 7 is little

more than shoulder wide and little more than a person's chest-to-back high. After discovery of Mud Turtle Passage, a side passage connected to Snowy River, a new, safer access portal was constructed by cavers over a two-year period between an older known location, the Don Sawyer Memorial Hall, to Mud Turtle Passage. Completed in May 2011, the 44-foot deep Snowy River Access Portal contains a stabilization structure made of a stainless steel frames and non-outgassing high-density polyurethane panels with concrete back fill.

The cave has a strongly joint-controlled, rectilinear pattern of phreatic origin, which means the cave formed below the water table in a series of cracks, or faults and its passages intersect at angles. These passages were later enlarged by running water, a process called vadose alteration. Passages run east to west and north-northeast to south-southwest. Geophysical surface studies indicate the presence of other passages associated with FSC, totaling 30(+) miles in length.

C. Affected Resources and Environmental Effects of Alternatives

The following resources or values are not present or would not be affected by the proposed plan: Areas of Critical Environmental Concern, Hazardous or Solid Waste, Wilderness, Prime or Unique Farmlands, Minority/Low Income Populations, and Environmental Justice.

i. Air Quality

Affected Environment

The NCA is located within a Class II air quality area. A Class II area allows moderate amounts of air quality degradation. The primary sources of air pollution in the NCA are dust from blowing wind on disturbed or exposed soil and exhaust emissions from motorized equipment.

The NCA is surrounded by U. S. Forest Service-managed public lands, State lands and private property. The Capitan Wilderness is located approximately nine miles northeast of the NCA and the White Mountain Wilderness is located approximately eight miles to the west. Under the Clean Air Act, the Capitan Wilderness has been classified as a Class II airshed and the White Mountain Wilderness has been classified as a Class I airshed.

Direct/Indirect Effects

Under all alternatives, surface disturbing activities and exhaust emissions, vegetation treatments, chemical odors, and dust from motorized equipment would affect air quality. The development of mineral material sites under the No Action Alternative and Alternatives A and C would result in increased surface disturbance, increased exhaust emissions, increased dust from motorized equipment, and increased negative effects to air quality in comparison to Alternative B, where mineral material sites would not be allowed.

Under Alternatives A and C, surface disturbance from drilling a cave portal would temporarily result in a short-term increase emissions in dust, adversely impacting air quality contrary to the No Action Alternative and Alternative B, where drilling a cave portal would not be allowed. Other short-term adverse impact to air quality would include smoke from prescribed fires as well as exhaust emissions, and dust from construction activities within the NCA. These

construction activities would be small in scale (less than 10 acres) and would include projects such as water pipeline maintenance, power line construction, road and trail maintenance, campsite development, drilling water wells, and drilling water monitoring wells.

Dust emissions would discontinue upon completion of projects. Exhaust emissions from motorized equipment would discontinue at the completion of the construction phase of the any future developments. The impacts to air quality would be greatly reduced as the construction phases and prescribed burns are completed. Other factors that currently affect air quality in the area include dust from livestock grazing activities, dust from recreational use (ATV's, Motor vehicles, etc.) from use of roads for vehicular traffic, and vegetation treatments.

ii. ***Water Resource Management – Surface Water and Groundwater***

Affected Environment

East of Highway 214 along the Rio Bonito, the Permian San Andres/Glorieta Formation outcrops at the land surface and is exposed eastward along most of the countryside of the Rio Bonito valley. Further east it is covered by younger Quaternary sediments about 10 to 15 miles from Roswell. West of the Highway 214 bridge over the Rio Bonito, the San Andres Formation generally dips westward under Sierra Blanca so that it is eventually about 2,000 feet below younger Mesozoic bedrock that outcrops at the land surface (Rawling, 2009). Fresh groundwater is available in the San Andres Groundwater Aquifer.

Perennial surface water is found on public land in Snowy River Passage at Crystal Creek Spring, on the Rio Bonito River and at Government Spring area. Ephemeral surface water within the area may be located in Salado Creek, tributaries, and stock tanks. Intermittent surface water is found in Fort Stanton - Snowy River Cave, the upper Rio Bonito River and Salado Creek. The majority of the NCA to the north is located within the Rio Bonito watershed where surface runoff flows through drainages into Salado Creek and the Rio Bonito. The southern portion of the NCA is located within the Rio Ruidoso watershed where surface runoff flows through drainages into Little Creek. Salado Creek joins the Rio Bonito which joins the Rio Ruidoso. Little Creek joins Eagle Creek which joins the Rio Ruidoso.

The upper Rio Bonito River on the NCA is an intermittent stream which experiences low to no surface water flows from time to time. The headwaters for the upper Rio Bonito River are located in the Sacramento Mountains on the slopes of Sierra Blanca. The upper Rio Bonito River has perennial flow from the headwaters down to Bonito Lake and Dam. The majority of the water in Bonito Lake is diverted from Bonito Dam to the City of Alamogordo which results in decreased flows and intermittent surface water flows from Bonito Dam down to through the Rio Bonito River to the Government Spring area. The source water for the lower Rio Bonito River is the Government Spring area. The lower Rio Bonito is perennial from Government Spring down to the confluence of the Rio Ruidoso and the Rio Hondo.

There are 86.19 acre-feet of surface water rights appurtenant to 26.52 acres of public land located within the NCA and 17 acre feet of ground water rights for wildlife and livestock. For a description of the water rights see Table 2.

Table 3. Fort Stanton-Snowy River Cave NCA water rights summary

NMOSE FILE NO.	NMOSE SUB FILE	NMOSE FILING DATE	NMOSE LEGAL DESCRIPTION	NMOSE AMOUNT (ACRE- FEET)	NMOSE ACREAGE	NMOSE PRIORITY DATE (a)	NMOSE DITCH NAME (b)	NMOSE POINT OF DIVERSION
01895*	B79S	950207	S½ NW¼, SECTION 14, T.9S, R.15E	34.125	10.5	1853	Upper Providencia and/or Government Springs	NE¼NE¼SE¼ SEC. 15, T.9S, R.15E
01894-B*	B79T	950207	SW¼ NE¼, SECTION 14, T.9S, R.15E	1.69	0.52	1860	Upper Providencia and/or Govt. Springs	NE¼NE¼SE¼ SEC. 15, T.9S, R.15E
01894-B*	B79U	950207	T.9S, R.15E	50.375	15.5	1860	Upper Providencia and/or Govt.Springs	NE¼NE¼SE¼ SEC. 15, T.9S, R.15E
01873-H**				5.0		1/13/1967		NE1/4SW1/4 SEC. 11, T.10S., R.14E
01959-H**				3.0		6/1/1931		NW1/4NE1/4NE1/4 SEC. 33 T.9S., R15E
01960-H**				3.0		12/31/1931		NE1/4NE1/4SE1/4 SEC. 8 T.9S., R15E
02094-H**				3.0		3/26/1987		NE1/4SW1/4SW1/4 SEC. 20 T.9S., R.15E
02321-H**				3.0		9/23/1993		SW1/4NE1/4NE1/4 SEC. 8 T.9S., R.15E

*Surface water rights.

**Groundwater water rights.

Direct/Indirect Effects

Under all alternatives surface disturbing activities such as construction and maintenance of water wells, water monitoring wells, road and trail maintenance, water pipeline maintenance, power line construction, and campground development can result in degradation of surface water quality and groundwater quality from non-point source pollution, increased soil losses, and increased gully erosion. These construction activities would be small in scale (less than 10 acres).

Potential direct impacts that would occur include increased surface water runoff and off-site sedimentation brought about by soil disturbance: water quality impairment of surface waters; channel morphology changes due to road, trail, and pipeline crossings. The magnitude of these impacts to water resources would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, soil character, duration and time within which construction or maintenance activity would occur, and the timely implementation and success or failure of mitigation measures.

Direct impacts would likely be greatest shortly after the start of construction and maintenance activities and would likely decrease over time due to natural stabilization, and reclamation efforts. Construction and maintenance activities would occur over a relatively short period; therefore, the majority of the disturbance would be intense but short lived. Direct impacts to

surface water quality would be minor, short-term impacts which may occur during storm flow events.

Accidentally spilled petroleum products from motorized equipment and other chemicals, such as transmission and engine oil could result in surface and groundwater contamination.

Authorization of the proposed projects would require full compliance with BLM directives and regulations that relate to surface and groundwater protection.

Under the No Action Alternative, Alternative A Preferred Alternative, and Alternative C, the development of mineral material sites would result in an increase in surface disturbing activities, increased soil losses, increased non-point source pollution and an increase in effects to surface water and groundwater as compared to Alternative B where mineral material sites would not be allowed. Under Alternatives A and C surface disturbance from drilling a cave portal would result in a short-term adverse increase impacts to surface water and groundwater as compared to the No Action Alternative and Alternative B where drilling a cave portal would not be allowed.

Under Alternative C, direct impacts to surface water quality from the construction of a cave portal would be minor. Short-term impacts may occur during storm flow events. Significant impacts on ground water would not occur. The BLM would manage the water rights associated with the NCA according to New Mexico Office of the State Engineer (OSE) laws and regulations. Under all alternatives, no impacts to water rights are expected. Current water rights management in the Roswell Field Office would continue unchanged in the NCA (see the 1997 Roswell RMP and the 2004 RBAL Final Activity Plan).

Water use proposals filed with the OSE by entities other than the BLM that could affect water rights and uses on public lands would be evaluated for their impact on BLM water resources. Drawdown of groundwater due to groundwater pumping in the area could lead to dewatering of cave biota habitat areas and riparian and wetland areas, and reducing water available for cave biota ecosystems and riparian and wetland ecosystems.

Proposals that would impair existing water rights such as public surface water rights and ground water rights and the quality of public land resources would be protested through procedures specified by the OSE. BLM water supplies and water resources which may be affected by water use proposals filed by applicants with the OSE are Government Springs area, Crystal Creek Spring and other springs located in Fort Stanton - Snowy River Cave, Rio Bonito, Salado Creek, and BLM owned groundwater wells.

iii. ***Floodplains***

Affected Environment

For BLM administrative purposes, the 100-year floodplain provides the basis for floodplain management on public lands. It is based on maps prepared by the Federal Emergency Management Agency. The prehistoric conditions of the Rio Bonito floodplain have been modified by construction of the Bonito Water Retention Dam, the Lutz Ditch Irrigation Diversion Dam, the Government Spring Irrigation Diversion Dam, the Cruz De Jara Ditch Irrigation Diversion Dam, the Sedillo Ditch Irrigation Diversion Dam, livestock grazing, upstream development, road construction, alteration of the stream channel, and brush encroachment.

The floodplain of the Salado Creek has been changed from prehistoric conditions by construction of the Salado Sediment Dam, livestock grazing, upstream development, road construction, alteration of the stream channel, and brush encroachment.

Direct/Indirect Effects

Under all alternatives surface disturbance from development, construction, and maintenance of trails, camping areas, roads, pipelines and power lines in the Planning Area can result in impairment of the floodplain from removal of vegetation, removal of wildlife habitat, impairment of water quality, decreased floodwater retention, and decreased groundwater recharge. Under the No Action Alternative, Alternative A Preferred Alternative, and Alternative C the development of mineral material sites would result in an increase in surface disturbing activities, increased soil losses, increased non-point source pollution and an increase in effects to floodplains than under the Alternative B where mineral material sites would not be allowed.

iv. **Soils**

Affected Environment

The Soil Conservation Service, now the Natural Resource Conservation Service (NRCS), has surveyed the soils in Lincoln County. Complete soil information is available in the *Soil Survey of Lincoln County, New Mexico, (USDA Soil Conservation Service 1983)*. The general soil map units represented in the project area are:

Deama-Rock outcrop - These soils are very shallow or shallow, well drained, nearly level to very steep soils, and rock outcrops located on hills, mesa sides, and breaks.

Romine-Hightower-Oro Grand - These soils are very shallow to moderately deep and very deep, well drained, nearly level to extremely steep soils located on ridges, hills and alluvial plains and in swales.

Tortugas-Rock outcrop-Asparas - These soils are very shallow, shallow, and very deep, well drained, nearly level to extremely steep soils, and rock outcrops located in valleys and on hills, piedmonts, ridges, and on mountainsides.

Direct/Indirect Effects

Under all Alternatives, surface disturbing activities such as development, construction, and maintenance of groundwater wells, groundwater monitoring wells, trails, camping areas, roads, pipelines, power lines, recreational use, and livestock grazing use could cause impacts to soils. Under all alternatives, actions and activities that make soils more susceptible to erosion, or which impair soil productivity include, but are not limited to:

- soil disturbing activities that result in soil loss due to accelerated wind or water erosion;
- activities that reduce vegetative cover, thus exposing the soil to erosion processes, and reducing the amount of soil organic matter and soil productivity;
- activities that tend to concentrate surface runoff or steepened hydraulic gradients, thus increasing soil erosion by flowing water;

- activities that result in sediment loading directly to streams;
- activities that damage soil structure by compaction or other means; and
- activities that degrade the physical, chemical, or biological properties of the soil, such as high-intensity burns or other means.

Under the No Action Alternative, and Alternatives A and C, the development of mineral material sites would result in an increase in surface disturbing activities, increased soil losses, increased non-point source pollution and an increase in effects to soils compared to Alternative B where mineral material sites would not be allowed.

Under Alternatives A and C, surface disturbance from drilling a cave portal would result in a closed two track road to the drill site by the drilling rig and support vehicles, concrete trucks and other vehicles. Construction of a portal would result in surface disturbance where the area is excavated to install the concrete block, pre-stressed concrete or steel vault. Excavated dirt would have to be removed to a suitable location. Cuttings from the air-water mist drilling may spray over the catchments box and would have to be shoveled into a container and removed. No drill pad would be constructed and levelers would be used during the drilling process.

v. *Riparian/Wetland Areas*

Affected Environment

The riparian areas of the NCA are found along the Rio Bonito and Salado Creek. Many springs and seeps occur in the area and are located in the Rio Bonito River, Salado Creek, and unnamed ephemeral tributaries. Wetland areas occur on the Rio Bonito River and behind Salado Dam. Many wildlife species are dependent upon the unique and diverse habitat niches offered by the riparian areas. These habitats are valuable sources of forage. Riparian vegetation provides escape cover for fish, lowers summer water temperatures by shading, and reduces stream bank erosion. Riparian areas are the center of many recreational activities within the NCA, such as hiking, mountain biking, hunting, dispersed camping, fishing, horseback riding, bird watching, and photography.

Healthy riparian systems purify water as it moves through the vegetation by removing sediment, and retains water in stream banks and groundwater. Riparian vegetation will also dissipate the energy of flood waters, slowly releasing water over time. The BLM began riparian enhancement projects on the Rio Bonito in 1982. Other projects followed and in 1990 the area was designated as the BLM's first National Riparian Showcase.

The BLM has instituted a qualitative method for assessing the condition of riparian-wetland areas referred to as Proper Functioning Condition (PFC). The assessment is used to determine the overall health of the system and is used to describe if a riparian area is functioning properly based on key attributes, including riparian vegetation, soils and hydrology. Riparian areas along the Rio Bonito and Salado Creek have steadily improved in function since 1990 from the limited or excluded livestock grazing, control of invasive and upland plant species, riparian plantings, road and campground closures, streambank and instream structures, encouragement of beaver activity, and upland vegetation treatments to increase groundcover. Current assessment of the majority

of riparian areas are at PFC with only a few segments functioning at risk with an upward trend. One of the segments is the Upper Rio Bonito Campground which will remain functioning at risk with an upward trend is due to an existing concrete bridge that modifies stream flow especially at high water.

Direct/Indirect Effects

Under all alternatives, surface disturbing activities could have impacts to riparian and wetland areas. Under Alternative A and C re-opening the Rio Bonito Campground 100 feet from the riparian area could have impacts to riparian vegetation. The 100-foot buffer was established during the Roswell RMP as a compromise between no camping within the immediate floodplain and no restrictions to camping along the Rio Bonito. Increasing visitor access to river segments would have long-term, indirect adverse impacts to riparian resources by increasing visitor traffic, bank trampling, and spread of noxious weeds. Re-opening the campground would result in a downward trend in PFC rating due to the impacts associated with the activity. Currently, the area is rated as functioning at risk with a stable trend.

Further environmental analysis would be performed before any decision regarding the re-establishment of the campground is made.

Under the No Action and Alternative B, there would be negligible impacts to riparian vegetation because the Rio Bonito Campground would not be re-established. The old campground would continue to recover from past impacts to the area from intensive vehicular camping.

Under the No Action Alternative and Alternatives A and C the development of mineral material sites would result in an increase in surface disturbing activities and an increase in effects to riparian and wetland areas compared to Alternative B where mineral material sites would not be allowed.

Under all alternatives, grazing would be limited or excluded from riparian and wetland areas. There would be a short-term reduction of standing vegetation as a result of grazing. Vegetation treatments would have a positive long-term impact by removing invasive species and restoring riparian/wetland areas. Using grazing and prescribed fire to reduce fuel loading would have a positive impact by reducing the chance of large catastrophic fires.

vi. ***Livestock Management***

Affected Environment

There are two different livestock management strategies being applied on the NCA. The majority of the NCA is exempt from the Taylor Grazing Act. This includes the area formerly known as the Fort Stanton ACEC as well as Tract 1 of the RBAL. Livestock management on these areas is to be used as a vegetation management tool. Grazing leases will not be issued in these areas, but grazing can be authorized on a limited basis when favorable forage conditions exist and if improvements such as fences are functional. High intensity, short-duration grazing could be used to address excessive fuels, light grazing could be used to maintain the desired plant community, or moderate grazing could be allowed based on seasonal production.

An 80-acre grazing allotment that bordered the former ACEC on the east is now contained within the NCA. This allotment is subject to the Taylor Grazing Act of 1934. The BLM conducted a Rangeland Health Assessment on March 29, 2010, on the allotment, #63071 Lamay Place. The allotment was rated as “meeting” the Standards for Rangeland Health and resource conditions have not changed. The grazing permit would authorize fifteen animal unit months (AUMs) on the allotment. Recommendations were made to map the allotment for juniper control treatment.

Direct/Indirect Effects

Under all alternatives livestock would continue to be used as a vegetation management tool when determined necessary on public lands within the former ACEC and Tract 1 of the Rio Bonito Acquired Lands. The impacts of using livestock grazing have been analyzed in the Roswell RMP, the Fort Stanton ACEC Activity Plan, and the Rio Bonito Acquired Lands Plan. Other resource management decisions are not expected to have impacts on livestock grazing within the NCA.

The impacts of issuing a permit to graze allotment #63071, Lamay Place, were analyzed in the Capitan Area Grazing EA, DOI-BLM-NM-P010-082-EA. To summarize the analysis in this EA found that vegetation would continue to be grazed and trampled by livestock as well as wildlife. Ecological condition and trend is expected to remain stable and/or improve over the long term with the proposed authorized number of livestock and existing pasture management. Rangeland monitoring data indicates that there is an adequate amount of forage for multiple resource use objectives. These impacts would be the same across all alternatives in this RMP amendment.

vii. **Vegetation Management**

Affected Environment

Grasslands and pinion-juniper (PJ) are major vegetation communities within the NCA. There is an estimated 19,000 acres of PJ located within the NCA. Most of the PJ is most prevalent in the east portion of the NCA on limestone hills. It dominates the landscape of the NCA, primarily as the result of the suppression of wildfires. However, the BLM has reintroduced fire to the ecosystem through prescribed fires. Prescribed burns are used to reduce PJ, control salt cedar and rehabilitate watersheds. Vegetation management, including PJ control, is a priority as it ties to watershed health and a multitude of other resource values.

General vegetation descriptions for the priority areas within the NCA are described Table 3

Table 4. General vegetation descriptions.

Project	Description
Upper Rio Bonito	Pinion-juniper on the uplands, grassland invaded by juniper in valley; Rio Bonito riparian area; invading saltcedar and Russian olive in riparian area; Kuenzler’s Hedgehog cactus on certain south-facing slopes
South Mesa	Primarily pinion-juniper and oak brush (especially on north aspect); grassland on mesa; juniper invading lower slopes and draws; Kuenzler’s Hedgehog cactus

	habitat on certain slopes
West Mesa Bench	Grassland on mesa; pinion-juniper on slopes and invading lower slopes; cholla invading grasslands on mesa; Kuenzler's Hedgehog cactus habitat on certain south-facing slopes and on the edge of mesa top
West Spur	Primarily pinion-juniper and oak brush on slopes (especially north aspect); grassland on flat mesas; West Spur Spring riparian area; draws and mesa tops invaded with juniper

Dairy Pasture	Primarily pinion-juniper on slopes (especially north aspect); juniper invading lower slopes and draws; Kuenzler's Hedgehog cactus on certain slopes
Cemetery Pasture	Mixture of pinion-juniper and grasslands; juniper invading grasslands and draws
Rio Bonito Tract 1	Pinion-juniper on the uplands, grassland invaded by juniper in valley; Rio Bonito riparian area; invading saltcedar and Russian olive in riparian area
Allotment #63071 Lamay Place	Primarily pinion-juniper and oak brush on slopes (especially north aspect)

Vegetation types in other areas of the ACEC either closely approximate the above description or are combinations of these descriptions.

The description for these ecological sites were developed by the Soil Conservation Service (now referred to as the National Resource Conservation Service) in their ecological site guides. Ecological site descriptions are available for review at the Roswell BLM office, any Natural Resources Conservation Service office or accessed at <http://www.nm.nrcs.usda.gov>.

Direct/Indirect Effects

The goals of vegetation management for the NCA were also discussed in the Fort Stanton ACEC Activity Plan, the Rio Bonito Acquired Lands Plan, and the Capitan Area Grazing EA, DOI-BLM-NM-P010-082-EA.

Under all alternatives when there is no livestock grazing within the NCA, impacts to vegetation will be minimal and vegetation will be utilized predominantly by wildlife.

Under all alternatives, when livestock grazing is used as a vegetation management tool, vegetation within the former ACEC and Rio Bonito Tract 1 would continue to be grazed and trampled by livestock as well as wildlife. Grazing within these areas will be controlled and monitored by the BLM.

Under all alternatives vegetation within allotment #63071, Lamay Place, would continue to be grazed and trampled by livestock as well as wildlife. Ecological condition and trend is expected to remain stable and/or improve over the long term with the proposed authorized number of livestock and existing pasture management. Rangeland monitoring data indicates that there is an adequate amount of forage for multiple resource use objectives.

Under the no action alternative and Alternative C disposable of saleable material effects will likely be temporary, the proposed actions will severely alter, if not completely remove, the plant

communities within the action areas. There will be further degradation of plant communities resulting from vehicle traffic, machinery operation, and materials deposition.

To minimize vegetation losses and soil disruptions, excavation and construction vehicle traffic should be limited to only those areas that are specifically needed to complete the proposed actions. Further, the unnecessary removal of any groundcover should be avoided. Care should be taken to replace the seed-bearing topsoil, as is practical, following construction. The regeneration processes may be expedited by stabilizing the replaced topsoil with organic mulch and by seeding with an approved native seed mixture.

Effects will likely be temporary, the proposed actions will severely alter, if not completely remove, the plant communities within the action areas. There will be further degradation of plant communities resulting from vehicle traffic, machinery operation, and materials deposition.

The use of mechanical and herbicidal treatments as well as prescribed fire would occur under all alternatives. With the use of mechanical treatment a change in cover and composition of juniper would occur to return the project areas to the historic climax plant community. According to Miller et al., "Crossing an ecological threshold from shrub steppe to woodland not only results in a significant reduction in the role of fire, but depending on the site may result in the loss of native plant species and loss of soils (2000). The management objectives would be to move from a juniper-dominated community to achieve composition of the desired plant community. Understory vegetation (grasses, forbs and shrubs) in the project areas would be temporarily disturbed by actual clearing activities but is expected to recover in a short period of time. Native plant species that serve as browse and forage for wildlife would increase from the removal of invading juniper.

Removing saltcedar, Russian olive, and Siberian elm in the riparian area would restore the health and function of the riparian community in the long term, allowing native riparian species to become re-established. Removal of saltcedar would restore the hydrology of an area and increases native species richness (Di Tomaso, 1998). Saltcedar, Russian olive, and Siberian elm are most susceptible to mechanical control if coupled with herbicide treatment.

The use of prescribed fire would temporarily reduce the density of standing vegetation. It is expected that understory vegetation and grass community fuels would recover in the short term. Recovery of vegetation would also be dependent on the time of the year a planned ignition occurred. Fire-tolerant species would be re-invigorated with fire, such as decadent grasses and shrub species. Forb species would initially respond to fire, thus increasing in abundance and diversity. Nutrient values of vegetation within the treatment area would be expected to increase due to the addition of organic matter back into the soil. A mosaic of burned and unburned vegetation would be created in the project burn area. High intensity fire may occur in certain portions of the planned project area. These sites would require a longer period to recover due to fire intensity.

viii. *Noxious and Invasive Weeds*

Affected Environment

Under Executive Order 13112 (EO), Invasive Species, the BLM is to prevent the introduction of invasive species; and control populations of these species in a cost-effective and environmentally sound manner. The Noxious Weed Management Act of 1998 for the State of New Mexico also defines three classes of these weeds.

“Class A” weeds are considered to be non-native species with limited distribution in New Mexico. Preventing new infestations and eliminating existing infestations is the highest priority. “Class B” weeds are non-native species that are presently limited to portions of the state. They are designated for control in regions where they are not yet widespread. Preventing infestation in these areas is a high priority. In regions where a “Class B” species is already abundant, control is decided at the local level with containment as the primary goal. “Class C” weeds are other non-native weeds found in New Mexico. Many of these are widespread in the state. Long-term programs of suppression and management are a local option, depending upon local threats and the feasibility of management in local areas.

The NCA is known to have populations of saltcedar (*Tamarix spp.*), a Class C weed, musk thistle (*Carduus nutans*) and teasel (*Dipsacus fullonum*), both Class B weeds. Poison hemlock (*Conium maculatum*), another Class B weed, is also present.

Saltcedar, also called tamarisk, is found along floodplains, riverbanks, stream courses, salt flats, marshes and irrigation ditches. Saltcedar is a fire-adapted species. The high water and salt content of saltcedar foliage make it difficult to burn. Saltcedar sprouts vigorously from the root crown and rhizomes after burning. Saltcedar exhibits increased flowering and seed production after fire. Saltcedar generally survives fire, although very hot fires may prevent sprouting. Prescribed burning alone may not be an effective control method for saltcedar. However, burning followed by herbicide application is effective. Musk thistle is biennial or sometimes a winter annual, which grows up to 6 feet tall. It invades pastures, range and forest lands along roadsides, waste areas, ditch banks, stream banks and grain fields. It spreads rapidly forming extremely dense stands which crowd out desirable forages and vegetation (Whitson, 2009).

Teasel spreads rapidly in moist sites, especially along irrigation ditches, canals and disturbed sites. It is a stout tap-rooted biennial which also grows to a height of 6 feet. A rosette is produced the first year, followed by bolting in the second year. The spiny heads can reach lengths of 2 inches (Whitson, 2009).

Poison hemlock occurs on borders of pastures and cropland, gradually invading perennial crops such as alfalfa. It tolerates poorly-drained soils and frequents stream and ditch banks. The entire plant is poisonous, including the large white taproot, and it has been mistaken for parsley (Whitson, 2009).

There are known populations of noxious and invasive species found within boundaries of the NCA. With these known populations, there is currently active management to control the populations within the NCA, including recent treatments on Tract 1 of the RBAL.

Direct/Indirect Effects

Noxious and invasive species will take advantage of areas opened up by disturbance, such as mineral material removal or trail building. This has generally been found where other native populations were removed by some kind of soil surface disturbance and drought followed. Thus, under the No Action Alternative and Alternatives A and C, where the NCA is open to the disposal of mineral materials, any mineral material removal, disturbance by visitors, equipment use, or by any other means could lead to the spread of weeds. The Re-establishment of good vegetative cover provides competition for noxious species, reducing their success. Livestock and wildlife will avoid grazing weeds as they may develop spines off of bracts below flowers, are toxic, or have low palatability, making these plants very unattractive.

ix. **Wildlife**

Affected Environment

Fort Stanton provides diverse habitats for approximately 151 species of birds, 38 species of mammals and 9 species of fish (BLM 1990).

Several bird species associated with pinion-juniper woodlands are the common flicker, ladder-backed woodpecker, acorn woodpecker, pinion jay, scrub jay, mountain chickadee, common bushtit, plain titmouse, white-breasted nuthatch, blue-gray gnatcatcher, gray vireo, rock wren, and Montezuma quail. Bird species associated with the blue grama grassland are scaled quail, roadrunner, western meadowlark, northern harrier, brown-headed cowbird, vesper sparrow, lark bunting, rufous-crowned sparrow, and horned lark. Several species of birds occur in the riparian community or near other sources of water. Representative species are acorn woodpecker, killdeer, mourning dove, mallard, bufflehead, wood duck, black hawk, belted kingfisher, blue grosbeak, lesser goldfinch, yellow-rumped warbler, northern waterthrush, and yellow-breasted chat. In addition, the bald eagle winters throughout the area.

The diversity of small mammals provide for an excellent prey base for carnivores such as the coyote, gray fox, bobcat, raccoon, badger, striped skunk, long-tailed weasel, and occasionally black bear and mountain lion. The Blue grama grasslands mammal species include the spotted ground squirrel, pocket gopher, silky pocket mouse, Ord's kangaroo rat, bannertail kangaroo rat, northern grasshopper mouse, southern plains woodrat, and the pronghorn antelope. Other mammals use the pinion-juniper woodland habitat to some extent. Mule deer occur throughout the Fort Stanton area. During winter, some deer migrate from the higher elevations of the Sierra Blanca Mountains to the Fort Stanton area. Since 1990, a number of Rocky Mountain elk have used the area on a year-long basis (BLM 1990).

Beavers use the riparian habitat to the exclusion of upland habitat. Over the past several years the beavers have built dams and lodges on the Rio Bonito. Annual floods that wash out the dams seem to be the most serious problem for the beavers. The beavers may also leave the area when water levels drop (BLM 1990).

The primary aquatic habitats supporting the fish species are the Rio Bonito and Salado Creek. Surface water flows on the NCA help maintain the riparian community found along the Rio Bonito which serves as shading for the stream, reducing sedimentation and the effects of

flooding, and keeping water temperatures cool. Fish species found in the Rio Bonito River are the Rio Grande sucker, brook trout, rainbow trout, cutthroat trout, fathead minnow, white sucker, Rio Grande chub, longnose dace, and mosquitofish. A list of aquatic insects and herptiles can be found in the Fort Stanton Habitat Management Plan on file at the Roswell Field Office (BLM 1990).

Fort Stanton Cave, excluding Snowy River Passage, serves as a hibernaculum, or winter roost, for about 700 Townsend's big-eared bats and lesser amounts of Western small-footed myotis and Cave Myotis. Feather Cave is a significant summer maternity roost, primarily for Townsend's Western Big-Eared Bat (Buecher, 2009, 2010). These and other regional hibernacula are closed annually from November 1st to April 15th to insure colony protection (Fed Reg, 1993). Waking hibernating bats causes them to use up energy stored as fat, of which fatty acids are a component. This fat cannot be restored because of a lack of insects, the mainstay of bats' diet, during the winter months and the bats perish (Buecher, 2006, 2009, and 2010).

A recent catastrophic threat to bats in the U.S. is a newly emergent fungal pathogen, white-nose syndrome (*Geomyces destructans*). The fungus was first documented in Howe's Caverns, New York, on a few bats in the winter of 2006, but by early 2010 it had moved approximately 120 miles per year from Howe's Caverns across 10 states and was found as far away as Virginia, West Virginia, Tennessee, Missouri and western Oklahoma (within 250 miles of northern New Mexico) in hibernation caves. This novel pathogen is related to fungi that are cold-loving and normally found in permafrost. Evidence suggests that *G. destructans* prefers a temperature range of 35-57°F and high, nearly saturated, humidity. Unfortunately, these conditions are also those preferred by many bat species for hibernation. It appears that the fungal hyphae invade the hair follicles and tissue of bat wings and tail membrane (uropatagium) of hibernating bats. It is suspected the fungus may irritate the skin of the bat causing bats to awaken more often to deal with the fungal irritation. In addition, the immune response of bats is reduced during hibernation and bats may be waking up to fight the infection. It appears bats are burning through their fat reserves too quickly and starving to death before spring. Recent research (Cryan et al. 2010) proposes that bat mortality is caused not only by the premature depletion of fat reserves, but also by catastrophic disruption of wing-dependent physiological functions. It is estimated more than 1,000,000 bats died of this malady by spring 2009. Recent research (Warnecke et al. 2012) supports the hypothesis that the accidental introduction of *G. destructans* from Europe is responsible for the WNS-related mass mortality of bats in North America.

Recent information obtained through a BLM-funded project referred to as the Ft. Stanton Cave Study Project initiated in 2012 has resulted in preliminary information concerning the diversity of bacteria found in cave soils and on bats. Soil samples and swabs from bats were taken to determine the types of bacteria and fungi present at Ft. Stanton, Crystal and Torgac Cave by researchers. The data collected identified the variety of bacteria and fungi present at these caves collectively referred to as microbiota. This study has added to the new information about bat microbiota in which no published studies were available. The initial information for the research indicates that the genus *Geomyces* is common in cave soils, that each species of bat

has a unique assemblage of microbiota. Fungal microbiota is also very diverse in the cave environments. From what is known now, it is unlikely that *Geomyces destructans* is present at the caves, including Ft. Stanton Cave, and that New Mexico bats do not have WNS.

Because there is a paucity of published information concerning cave and bat microbiota, more research is needed to include additional soil and bat sampling, a comparison of New Mexico bats to East Coast bats, a closer look at *Actinobacteria* on bats, which is believed to be protecting the bats from *G. destructans*, and for establishing monitoring programs and protocols to detect WNS.

Invertebrate species in Fort Stanton and other NCA caves include 1 mm-long diplurans and millipedes which feed off dead bats and residue from visiting humans in the form of hair and skin cells that get deposited during cave trips. This is known from recent human impact DNA sequencing by the Biology Department, University of New Mexico.

Direct/Indirect Effects

Under all Alternatives, short-term negative impacts to terrestrial wildlife would occur during vegetation treatments, camping, hiking, horseback riding, and re-routing existing trails. Small wildlife may be temporarily displaced due to construction to re-route trails. In general most wildlife species would temporarily leave the area during these activities and return shortly after. For other wildlife species with a low tolerance to disturbance, the operations or activities could displace wildlife from the area due to disturbances by vehicle traffic and human presence.

Long-term positive impacts would result from prescribed fire, vegetation treatments, designated camping areas, roads and closed roads. Vegetation and prescribed fire treatments would benefit wildlife by removing invasive species and restoring habitat. Designated camping areas, roads and closed roads would help isolate human presence in certain areas allowing wildlife to adjust and use more secluded areas.

Under Alternatives A and C, re-opening the Rio Bonito Campground 100 feet from the riparian area could have potential impacts to riparian vegetation and aquatic habitat and fisheries. Increasing visitor access to river segments would have long-term, indirect adverse impacts to riparian resources by increasing visitor traffic, bank trampling, and spread of noxious weeds

Under the No Action Alternative and Alternative B, there would be negligible impacts to aquatic habitat for fisheries as the Rio Bonito Campground would not be re-established. The policy of avoidance of important resource values such as aquatic habitats would continue in this NCA plan. Under all alternatives new surface disturbance activities would be analyzed for potential impacts to stream sedimentation and affects to channel morphology and mitigated to reduce or eliminate short and long term direct impacts to water quality resources for fisheries.

Under all alternatives, with a focus on sub-surface resource management of the Ft. Stanton Cave system, there would be no measurable effects on aquatic fisheries habitat.

If grazing is used as a tool on the NCA using the prescriptions in place (no grazing around cave entrances, and in developed campgrounds), then livestock grazing should have little effect on wildlife.

Under Alternative B there would be no impacts to wildlife as no portal would be constructed. Under Alternatives A and C impacts to wildlife would be short-term during construction of a portal. Some small wildlife species may be displaced. Once construction is completed, the changes in habitat above ground would be minimal and should have little impact on wildlife. Timing restrictions with respect to elk calving and deer fawning would be respected and drilling would occur in an appropriate timeframe. Most species would be expected to habituate to the small blockhouse in a short time. There are no known wildlife species other than microbes in the portion of the cave involved in this project. Bats are only known to occur near the natural cave entrance. The use of two airtight bulkheads would prevent any changes to the cave environment that could affect bats or other wildlife in other portions of the cave.

Under the No Action Alternative and Alternatives A and C the development of mineral material sites would result in an increase in surface disturbing activities and an increase in effects to fisheries compared to Alternative B, where mineral material sites would not be allowed.

There is the threat that White-Nose Syndrome (WNS) could be transferred to Fort Stanton Cave. The Roswell Field Office has a number of known hibernacula for Townsend's big-eared bats (*Corynorhinus townsendii*). Prior to this disease in hibernating bats, the BLM has conducted and continues to conduct bi-annual hibernation census at a number of the caves in the BLM's Pecos District. That effort has been combined with monitoring techniques to detect for possible arrival of WNS. Bat researchers have demonstrated that bat-to-bat contact is the primary vector in the spread of the syndrome. There is a human vector element of WNS because the fungi originated in Europe, no bat species migrates between Europe and North America and the initial outbreak was a cave popular with tourists in New York.

The U.S. Fish and Wildlife Service has provided strict guidelines for decontamination of all equipment, clothing and people (Appendices 1 & 3). The Roswell Field Office has implemented decontamination procedures and would consider closing BLM caves under its jurisdiction in order to slow the spread of WNS.

x. ***Special Status Species***

Definition: BLM Special Status Species are those federally listed or proposed as threatened or endangered, and those designated as BLM Sensitive Species, which includes both Federal candidate species and federally delisted species within 5 years of delisting.

a) **Kuenzler's Hedgehog Cactus (*Echinocereus fenderli* var. *kuenzleri*)**

Affected Environment

Kuenzler's hedgehog cactus is listed as federal and State endangered in New Mexico. The NCA supports the largest known population of the cactus in the state. Prime habitat is on open southeast-facing aspects on the upper third of 20 percent slopes in the pinion-juniper zone at 6,600 to 6,900 feet elevation. Healthy populations also occur on level ridge tops, on northeast, east, south and west aspects, on mid and lower slopes of 5 to 25 percent slope, and even on the lower slopes below a band of pinion-juniper or oak.

An extensive population survey was conducted in 1991 by Natural Heritage New Mexico (NHNM) under BLM contract which identified the main concentration areas of the cactus as generally west of Highway 220. Sites for protection are all of the identified polygons of cactus populations, with the ten largest cactus populations having the highest priority for protection. New and expanded populations can be found through planned population surveys or during the process of field clearing proposed projects or events.

Since 1991, the BLM has contracted with NHNM to conduct additional studies, specifically in 1995, 2011 and 2012. Population studies include an intensive survey for the cactus, monitoring of recruitment of young individuals of the species, and to ascertain potential impacts from activities such as recreational events held utilizing the designated trails system, wild and prescribed fires, and hazardous fuels reduction projects to include juniper control. The focus of the surveys, were six permanent monitoring plots established in 1991.

In 2012, an effort to initially determine the status of the cactus on a range-wide basis was conducted by NMNHP through contract with the BLM. A final 2013 report is pending with an initial determination that the populations sampled at the Ft. Stanton NCA are either stable or upwardly trending (NHNM 2013).

The BLM conducted Endangered Species Act Section 7 consultation with the U.S. Fish and Wildlife Service when it developed the 1997 Roswell RMP. The consultation included the Kuenzler's hedgehog cactus and the Service agreed with the BLM's conclusion that activities may affect, but not likely to adversely affect the species through their Biological Opinion provided to the BLM (Cons. #2-2296 F-102). (BLM 1997)

Endangered plant species, such as Kuenzler's hedgehog cactus, are managed through a policy of avoidance. All surface disturbance activities are located on sites where the species does not occur. As surface disturbing activities were authorized prior to the designation of the NCA, a survey for the presence of Kuenzler's hedgehog cactus was conducted. Projects that conflicted with cactus locations were either moved, rerouted, or not approved.

Direct/Indirect Effects

Under all alternatives, there would be no direct or indirect effect to the cactus resulting from the proposed activities in the NCA plan. The policy of avoidance would continue in this NCA plan consistent with the Biological Opinion. Prescribed burns would not be conducted in areas inhabited by the cactus, and in the case of wildfire, the use of bulldozers is prohibited.

Under all alternatives, new surface disturbance activities would be surveyed for the cactus prior to any authorization. Sites containing the cactus would be avoided. This includes potential location for portal access under Alternative A and C.

b) Mexican Spotted Owl (*Strix occidentalis lucida*)

Affected Environment

The Mexican spotted owl is listed as a federal threatened species. The spotted owl is a resident raptor species found throughout the mountains and canyons of Arizona, New Mexico, southern Colorado and Utah, and northern and central Mexico. Most of these birds reside in a band of

mixed-coniferous and ponderosa pine/Gambel oak (*Pinus ponderosa/Quercus gambelii*) forest stretching southeast from the southern portion of the Kaibab National Forest in northcentral Arizona down to the Gila National Forest in southwestern New Mexico. There are also substantial subpopulations located in the Sky Island mountain ranges in southern Arizona and in the Sacramento Mountains in southern New Mexico (Ward et al. 1995)

Mexican spotted owls typically nest and roost in structurally-complex, diverse forests with a variety of age- and/or size-classes, a component of large trees, often with many snags and down logs and relatively high basal areas and canopy closures (Ganey et al. 1999; Gutiérrez 1996; Ganey and Dick 1995). These conditions are typical of old-growth type forests that have generally had minimal human-caused disturbance (Helms 1998). Ganey and Balda (1994), in a study of radio-tagged owls in northern Arizona, found that they did not forage randomly among available habitat types. Rather they tended to be found more often than expected (assuming random habitat selection) in unlogged forests and less often in managed forests, and they were rarely found in non-forested areas.

Direct/Indirect Effects

As no suitable or designated critical habitat areas found at the NCA for the spotted owl, there would be no impacts from actions proposed in the NCA plan.

c) Gray Vireo (*Vireo vicinior*)

Affected Environment

The gray vireo is listed as a state threatened species. Gray vireo breeds in mid-elevation woodland and scrubland habitats of the southwestern United States and northern Mexico. Most the species' range falls within the states of Utah, Colorado, Arizona, and New Mexico. Gray vireos typically prefer open piñon-juniper woodland or juniper savannah with a shrub component. In New Mexico, the species occurs in chaparral-juniper, piñon-juniper, and piñon-madrone associations (New Mexico Partners in Flight 2007). Gray vireos arrive in New Mexico from mid to late April, and generally depart by mid-August, and winter in coastal and desert areas of Sonora and Baja California in Mexico (New Mexico Partners in Flight 2007).

No specific populations surveys have been conducted at the NCA for the gray vireo to date although habitat exists over the majority of the NCA. There have been no recent observations made of this species by the BLM.

Direct/Indirect Effects

Under all alternative, a site-specific analysis would be conducted for activities such as mechanical treatment, herbicidal treatment and prescribed fire. Proposed projects in pinion-juniper habitats are relatively small and scattered with sufficient habitat available for the species elsewhere in the NCA. Prior to any future treatments, a survey for the gray vireo would be conducted to determine presence and habitat use, or absence, in a proposed project area following an accepted protocol for conducting bird surveys. After detection surveys are conducted, mechanical treatments and prescribed burns would be conducted in selected pinion-

juniper, riparian and grassland community types with proper mitigation such as avoidance areas, buffer zones, and temporal stipulations as needed.

Considering the policy of avoidance for this species and occupied habitat that may be detected during a survey of a proposed project, there would be no adverse direct or indirect impacts to the species.

d) Bald Eagle (*Haliaeetus leucocephalus*)

Affected Environment

The bald eagle is listed as a state threatened species. The species is primarily water-oriented, and the majority of the populations, occurring in New Mexico are found near streams and lakes. On the other hand, there are some "dry land" areas where these eagles occur regularly--most notably in the region between the Pecos Valley and the Sandia, Manzano, Capitan, and Sacramento mountains, plus on the Mogollon Plateau (NMDGF 1988). The few nests reported from New Mexico have been in trees and on cliffs, which are typical sites elsewhere as well. New Mexico harbors a small breeding population along the shores of lakes primarily in the northern part of the state. Bald eagles are uncommon winter residents in the Sacramento Mountains of the Lincoln National Forest (USFS, 1995) and are known to winter roost in the Grindstone Canyon area.

Direct/Indirect Effects

Under all alternatives, because the Bald Eagle is an uncommon species at the NCA with no nesting or roosting habitat available, and may occasionally be seen in the area during the winter months, the actions proposed in the NCA plan would not impact the Bald Eagle.

xi. **Visual Resources**

Affected Environment

The topography of the NCA is highly variable, with rolling hills, wide, flat-topped mesas, and narrow, rocky canyons and ridges. It is situated in the foothills of the Sierra Blanca and Capitan Mountains. Elevation above sea level ranges from 6,300 feet in the east to 7,020 feet in the west.

A Visual Resource inventory was completed for the 1997 RMP and the results of that inventory were incorporated into the RMP, including what was to become the NCA. The Visual Resources within NCA area are currently managed as Class II, III and IV.

There are 9,553 acres in the NCA currently managed in the 1997 Roswell RMP as Class II VRM. This includes the area along the Upper Rio Bonito as well as the northeast section of the NCA. The Class II rating means that any changes in any basic elements (form, line, color, texture) caused by a management activity should not be evident in the landscape. A contrast may be seen but should not attract attention.

There are 10,367 acres in the NCA currently managed in the 1997 Roswell RMP as Class III VRM. This is mostly in the western section of the NCA (Upper Mesa), the northern section (Salado

Pasture and Rio Bonito Tract 1), and a small portion along State Route 220 on the eastern section of the NCA. The Class III rating means the contrasts to the basic elements caused by the management activity may be evident and begin to attract attention in the landscape. The changes, however, would remain subordinate to the existing landscape.

There are 4,972 acres in the NCA currently managed in the 1997 Roswell RMP as Class IV VRM on the NCA, completely on areas surrounding the Sierra Blanca Regional Airport and Fort Stanton Proper. The Class IV rating means that changes to the basic elements caused by management activity can be highly visible. Any management actions may dominate the visual landscape; however care should be taken to minimize visual impacts as much as possible.

Direct/Indirect Effects

The Preferred Alternative would designate all current Class IV management areas as Class III. A total of 4,972 acres would be affected by this change. Managing Class IV areas as Class III would have a positive impact on the visual resources in those areas. All existing Class IV management actions would remain. All further management actions would be managed as Class III, requiring those actions be less visible and to draw less attention to these actions under this designation.

Under Alternatives B and C, the impacts would be the same as under the Preferred Alternative. Under the No Action Alternative, the NCA would continue to be managed under the three separate VRM Classes resulting in no additional impacts.

Under Alternatives A and C, impacts to the viewshed from surface disturbances, such as mineral materials sites or drilling a cave portal would be short-term from construction; however, the visual impact from the change in topography is long term for mineral material sites. Drilling a cave portal surface disturbance would be lasting only as long as the activity occurs and subsequent reclamation of disturbed sites take place. Surface disturbance would present impacts until the area was reclaimed and the vegetation restored, probably less than four growing seasons in length. There would be no changes in visual class presented by the blockhouse at the top of the shaft since it would extend only two feet above the surface.

xii. **Recreation**

Affected Environment

The NCA has about 73 miles of trail designed for horseback, mountain biking, and hiking. One of these trails, the Rio Bonito Petroglyph Trail, is a designated National Recreation Trail. 20 miles of designated roads are also located in the NCA. All roads and trails are marked with signs stating open or closed and delineate permissible access, whether by foot, horseback, mountain bike, or vehicle. See the Fort Stanton ACEC Route Designation Plan for further information.

There are two established camping areas: an equestrian trailhead on NM 220 and a campground at the Fort Stanton Cave entrance. There are facilities for equine stock and water located at the equestrian trailhead on NM 220. Several tables, fire rings and a toilet are located at the Cave Campground. The Cave Campground does not have equestrian facilities or water.

Approximately 20,910 visitors recreated on the NCA in fiscal year 2009. Fiscal year 2010 visitation was 13,494. Visitors come to the NCA for many reasons. The extensive sustainable trail system and stock facilities provide quality riding opportunities for equestrians. The prime big game habitat offers excellent hunting opportunities, including a state designated deer hunting area dedicated to youth. Other recreational opportunities include hiking, mountain biking, wildlife viewing, photography, and camping.

The NCA also attracts cavers to Fort Stanton Cave, the third longest cave system in New Mexico. Fort Stanton recreational cave trips can range from two hours to more than 20 hours. Safe caving practices demand at least three sources of light for each person and a minimum of three persons per trip. A hard hat or caving/climbing helmet is needed to protect the head. Appropriate clothing is needed as temperatures in the cave average about 56 degrees. Venturing through Hell Hole and into the passages beyond involves a very strenuous trip which requires experience and physical fitness. Commercial recreational operations are authorized in Fort Stanton Cave and are used to interpret protection of natural resources through the principles of Leave No Trace.

The NCA also lends itself to special recreation events such as equestrian, living history, mountain bike, orienteering, and group camping events. The area has hosted many of these events in the past.

Direct/Indirect Effects

Sites currently used for dispersed camping by recreationists would continue to experience surface disturbances caused by vehicles pulling off a road up to the allowed 100 feet for camping purposes. These sites, however, tend to recover rapidly during normal rain events and annual growing season. Seed mixtures appropriate for this area would be applied, if necessary, for reclamation purposes.

The 93 miles of trails on the NCA for equestrian, hiking, and mountain biking are constructed to sustainability standards. Only the designated trailhead would experience impacts from use by equestrian riders, hikers, and mountain bikers. These impacts are mitigated through annual maintenance of the trails. Areas outside the designated trails would not experience adverse impacts.

The equestrian trailhead would continue to see heavy equestrian, hiking, and mountain bike use. However, at this facility, impacts are lessened due to established parking areas, controlled vehicle and equestrian traffic, and rapid recovery of vegetation during normal rain events and growing seasons. Appropriate Seed mixtures for this area would be applied if necessary for reclamation purposes.

New dispersed camping sites would be expected to develop on the NCA if "vehicle camper" visitor use increases. Surface disturbances would occur as recreationists drive off designated roads to establish a camp site. Disturbed areas would be expected to recover due to rain events and annual growing season.

The trails are all closed to motorized OHV use, except where they overlap with the 20 miles of designated roads. Under Alternatives A, B and C, limiting OHVs to designated open roads

instead of roads and trails would have no impact since no trails are currently designated as open to OHV use. Thus there would be no net change in available routes for OHVs. Restricting OHVs to roads would benefit the visitors in the NCA by channeling OHV users away from visitors seeking quiet and solitude.

The impacts from special recreation use permits have been analyzed in individual National Environmental Policy Act (NEPA) documents and will continue to be analyzed on a case-by-case basis.

Under Alternatives A and B instituting fees for campground use could have positive and negative effects. Money collected from fees would benefit the resource and would provide tangible products such as signs, maps, brochures, and site improvements. This would increase visitor satisfaction, possibly leading to increased visitation. Some user groups may oppose fees resulting in strained relations between the BLM and these users. Self-service fee tubes would be employed if a campground host is not available to collect fees. These tubes could be vandalized and theft of fees could occur.

Under Alternatives A and C, if the criteria for creating a Rio Bonito Campground are met, a campground could be established. Opening a campground in this area would increase visitation to the Upper Rio Bonito Valley. This would increase surface disturbance and traffic.

Under all alternatives the total number of recreational permits issued per year is not to exceed 398 and the total recreational visitation per year is not to exceed 3,184 people. Since the recreational permit process and visitor limits to Fort Stanton Cave were implemented, the number of recreation permits has not exceeded 200 and the number of recreation visitors has not exceeded 1,500.

Up to 20 percent of recreation permits could be issued for commercial use under the No Action Alternative and Alternative A. Alternative B would limit the commercial use of recreation permits to 10 percent. There may be no impacts to commercial cave usage from this reduction since commercial use is currently less than two percent of recreational permits. If future commercial usage increases, however, this could limit opportunities for recreational access to the cave. Under Alternative C up to 30 percent of annual recreation permits could be issued for commercial use. A higher percentage of annual recreation permits could result in additional commercial operators in the future and could increase the opportunity for recreational access to the cave.

Under Alternative B fees for cave permits could have both positive and negative effects. Similar to collecting fees for campgrounds, these fees would benefit the resource and provide tangible products such as brochures and site improvements within the cave. Brochures and site improvements could increase visitor satisfaction, or could lead to increased strained relations between the BLM and the cavers. Additionally, the cave permit fees would increase the costs for commercial cave guides who will most likely pass those costs on to their clients. The increase may reduce income for commercial guides if clientele perceive the price of guided cave tours to be excessive or simply unaffordable.

Ten people per permit are allowed in the front portion of Fort Stanton Cave and six people per permit are allowed in the back portion under the No Action Alternative. There have been recent

discoveries of unauthorized formation mining and other significant impacts in the back section of the cave beyond the Hell Hole Gate. These impacts would likely continue under this alternative.

Under Alternatives A, B and C a range of three to ten people per permit would be allowed in the front portion of the cave and three to six people per permit would be allowed in the portion beyond Hell Hole gate. This limitation remains the same or below current management, which should not create greater impacts than current management and could reduce impacts. The use of BLM-authorized guides beyond the Hell Hole Gate would reduce the risk of formation mining and other adverse impacts. These BLM-approved guides would be required to have special training in Leave No Trace (LNT) backcountry ethics and visitor management. As in the No Action Alternative, periodic science and survey trips, under administrative permits, may exceed this limitation.

Within the cave interior, trails focus visitor travel to passage centers, thus preventing adverse impacts to cave resources and objects in various locations. Under the No Action Alternative and Alternatives A and B there is no recreational access to the Snowy River Passage, Lincoln Cavern, Priority 7, and Bat Cave areas in Fort Stanton Cave as these are either for research or hazardous sites.

Alternative C would allow limited recreational access to the Snowy River Passage of Fort Stanton Cave under certain defined conditions. (See Appendix 3, Implementation.) This could cause human influence on biotic communities, especially if trip/permit stipulations and research guidelines were not effectively followed over time, which could diminish the value of these resources for scientific purposes.

The limits of acceptable change to Fort Stanton Cave caused by impacts of visitation and monitoring for those impacts are described in Appendix 3, Monitoring and Implementation.

xiii. ***Wild and Scenic Rivers***

Affected Environment

In preparation for this NCA Plan the BLM updated the Wild and Scenic Rivers inventory for the Rio Bonito and Salado Creek segments in the NCA. The Salado Creek Segment included the entire length of Salado Creek that was within the NCA boundary. The Rio Bonito was divided into three segments. Rio Bonito Segment 1 is the portion of the Rio Bonito that runs from the western boundary of the NCA to the western boundary of the land controlled by New Mexico State. Segment 2 of the Rio Bonito extends from the eastern boundary of the State land to the Government Springs area. Rio Bonito Segment 3 starts at the Government Springs area, where several springs and seeps vastly change the morphology of the river, to the eastern boundary of the NCA.

The river segments were evaluated using the guidance in BLM Handbook #8351, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, and Management. Each segment was evaluated for free-flowing characteristics and Outstandingly Remarkable Values

(ORVs). A Wild and Scenic River must be both free-flowing and have at least one ORV. The results of this inventory are included in the permanent Administrative Record for the NCA Plan.

The recent inventory determined that Segment 1 of the Rio Bonito River is, eligible under the NWSRS with a tentative classification as scenic. Segment 1 is free-flowing and has Scenic, Recreational, and Cultural ORVs. Rio Bonito River Segments 2 and 3 were determined to have free-flowing characteristics but did not have any ORVs. Salado Creek was determined to have free-flowing characteristics but did not have any ORVs.

Direct/Indirect Effects

Under Alternative B, Rio Bonito Segment 1 would be recommended for inclusion in the NWSRS. Because this segment is wholly within the NCA, the inclusion of the segment in the NWSRS would not measurably contribute to increased protection. However, it may draw more attention to the river segment leading to increased visitation.

Under Alternative A, the Preferred Alternative, as well as Alternative C, the BLM will not recommend that Rio Bonito Segment 1 be added to the NWSRS. Since this river is located within a National Conservation Area, the river values are adequately protected. The NCA designation and other existing management prescriptions appropriately protect the free-flowing characteristic and the ORVs. Inclusion of the segment in the NWSRS would not be expected to enhance this protection. Also, the flow of this segment of the Rio Bonito is severely restricted by the Bonito Dam, which is located upstream of the segment on City of Alamogordo land. The BLM is limited in its ability to protect the river flows due to this upstream water rights allocation.

Under the no action alternative, a suitability recommendation for Rio Bonito Segment 1 would be deferred. The values contributing to its eligibility for inclusion in the NWSRS would be protected until an evaluation of suitability is made at a later date.

xiv. **Mineral Resources**

Affected Environment

The Roswell RMP designated the area now known as the NCA, as withdrawn from mineral entry and closed to mineral leasing. It also designated the area as open to the discretionary disposal of mineral materials (e.g., sand, gravel). PL 111-11 clarified that the area is withdrawn from location, entry, and patent under the mining laws and operation under the mineral leasing and geothermal leasing laws. The Act, however, retained the discretion for BLM to determine the appropriate management for mineral materials.

Disposal of Mineral materials are commodities disposed of via sales or free use (government agencies and municipalities) by the Federal government and generally comprise common varieties of construction materials and aggregates.

Direct/Indirect Effects

Under all alternatives, the withdrawal from mineral entry and the mineral leasing closure will continue to remain in effect and these minerals would continue to be unavailable for

exploration or development. Impacts would continue to be negligible as these lands have not been available since PL 111-11 took effect.

Under Alternative A disposal of mineral materials are available only for administrative use within the NCA. Under Alternative C and the No Action Alternative all public lands in the NCA would remain open to the commercial disposal of mineral materials, except for approximately 330 acres in the Feather Cave Archaeological Complex. An irreversible and irretrievable commitment of resources occurs when mining is conducted and minerals are sold. Economic benefits are realized from the sale and the future use of the materials. Cave passages would be avoided when mineral materials are made available.

Under the No Action Alternative and Alternatives A and C, the development of mineral materials sites would result in an increase in surface disturbing activities, increased soil losses, increased non-point source pollution, and an increase in effects to soils compared to Alternative B, where mineral material sites would not be allowed.

Under Alternative B, the NCA would be closed to all disposal of mineral materials, including administrative use by the BLM. This would increase the costs of doing business by delaying projects, forcing alternative sources for mineral materials, increasing haul distances, increasing haul costs, limiting flexibility in timing of activities, increasing reclamation costs, and precluding some activities. Closing the NCA to the disposal of mineral materials would avoid impacts to soils and water described above and in previous sections of this document. Additionally, the closure would preserve the topography and the viewshed of the NCA.

xv. ***Cultural Resources***

Affected Environment

Human occupation of the Fort Stanton area extends back in time to the Archaic Period (approximately 5500 BC – 400 AD). Archaic sites are rare on Fort Stanton but several of these archaeological sites have been located and dated to 6000 BC (Shelley and Wenzel; 2002). Although isolated projectile points have been found within the NCA that date to the Paleo-Indian (11,000-5000 BC) period, as of yet, Paleo-Indian archaeological sites have not been located, thus a Paleo-Indian occupation is not warranted. The Archaic time period is represented by a number of sites, as is the Formative (900-1400 AD), also called the Ceramic time period. The variety of prehistoric sites ranges from open sites to rock shelters, caves, architecture (pit houses) and petroglyphs. Site density is high along major drainages such as the Rio Bonito. The Fort Stanton area seems to have been abandoned from 1300 to 1450 by the agriculturalists of the Formative period (Shelley and Wenzel; 2002). This corresponds to large population shifts as seen in other areas of the Southwest and is probably due to climate changes.

There are several large pueblos located within a few miles of the NCA, which have evidence of intensive agricultural societies: Robinson Pueblo, Double Crossing Ruin, and LA 51344. These sites also indicate a large hunting season, as seen by the amount of pronghorn antelope and other mammal remains. All of these sites are within the Formative Period.

Little information is known of the early proto-historic occupation of the NCA. Investigations of early Mescalero Apache sites that are associated with the NCA are currently ongoing. Results of those investigations should reveal important information of land usage in the early 1500s. Hispanic peoples began settling in the area in the first half of the nineteenth century. By 1855, Fort Stanton was built to provide protection for the local Anglo and Hispanic population from the Mescalero Apaches. Other known historic sites date to the same time frame and are associated with Fort Stanton.

In consultation with the Mescalero Apache, the BLM has identified the presence of potential Traditional Cultural Properties (TCP) as told in the Mescalero Apache oral history. No specific locations have been evaluated as TCPs, but an ethnographic study capturing the Mescalero Apache oral history as it pertains to the NCA would be considered.

The interior of Fort Stanton-Snowy River Cave has had no cultural resource inventory to date. Cave specialists have identified the presence of historical features inside the mouth of the cave. Light foot traffic through the cave does not define as a federal undertaking and has no potential to directly impact Historic Properties. In order to prevent indirect impacts to Historic Properties, cavers are briefed and shall continue to be briefed prior to entering Fort Stanton-Snowy River Cave to leave all cultural features or artifacts in place. All future proposals that will include ground disturbance shall be evaluated for the presence of cultural resources prior to these activities occurring.

The interior of Fort Stanton-Snowy River Cave has had no cultural resource inventory to date. Cave specialists have identified the presence of historical features inside the mouth of the cave. Light foot traffic through the cave does not define as a federal undertaking and has no potential to directly impact Historic Properties. In order to prevent indirect impacts to Historic Properties, cavers are briefed and shall continue to be briefed prior to entering Fort Stanton-Snowy River Cave to leave all cultural features or artifacts in place. All future proposals that will include ground disturbance shall be evaluated for the presence of cultural resources prior to these activities occurring.

There have been several large cultural inventories on the NCA. One of these commenced prior to the construction of the Sierra Blanca Regional Airport and covered 1,700 acres. Other large inventories have focused on the Rio Bonito drainage. Smaller inventories have occurred prior to small-scale surface disturbing projects such as water line and fence construction. A total of 33 small cultural resource inventories have been conducted for a total of 770 acres out of the 24,876 acres within the NCA, or 0.03 percent. A total of 82 cultural resource inventories have been conducted for a total of 1,412 acres out of the 24,876 acres within the NCA, or 5.6 percent.

In addition to cultural inventories, excavations have been permitted as part of archaeological field schools for research and ahead of construction projects for U.S. Highway 380 improvements.

Direct/Indirect Effects

Cultural inventories will continue to be required before any ground disturbing activities are authorized. Recreation sites, administrative mineral material sites and events have been and will continue to be located to avoid cultural resources.

Under Alternatives A and C, the surface drill sites and access roads for drilling a cave portal would avoid cultural sites. An intensive cultural resource inventory would be completed prior to surface and subsurface construction of the proposed portal. Cultural resources found would be avoided during portal construction.

Under Alternative B, as well as the No Action Alternative, effects to cultural resources and TCPs would remain the same.

xvi. ***Paleontological Resources***

Affected Environment

In general terms, the east side of the NCA has low potential for paleontological resources. Most of this area is limestone, sandstone, siltstone, anhydrite and gypsum. Invertebrate fossils may be abundant in limestone material. There is a greater potential for paleontological resources associated with cave and karst features, including the presence of vertebrate (Pleistocene) fossils.

The north and west sides of the NCA have greater potential for paleontological resources. Formation found in these areas represent continental, fluvial and flood plain depositional environments.

The south side of the NCA has moderate potential for paleontological resources. Formation found in this area, represent deep to shallow marine depositional environments.

Direct/Indirect Effects

Ground disturbing activities in the east and south sides of the NCA are not likely to require mitigation. Ground disturbing activities in the north and west sides need to be evaluated on a case-by-case bases for the need to mitigate those activities.

xvii. ***Land Tenure***

Affected Environment

The NCA is comprised of 24,876 acres of federal land managed by the Bureau of Land Management. Within the boundary of the NCA, there are in-holdings owned by the State of New Mexico and the Village of Ruidoso. There is a small private inholding near Highway 280 which is surrounded by the NCA. There is a total of 1,325 acres of State land; including Fort Stanton Proper (227 acres), the Post Cemetery (1.2 acres) and the Merchant Marine Cemetery (12 acres). Camp Sierra Blanca and other facilities are included in the overall number. In addition, the Sierra Blanca Regional Airport, owned by the Village of Ruidoso, contains 1,677 acres. Surrounding the NCA are holdings managed or owned by the US Forest Service, State of New Mexico and private individuals.

Public Law 111-11 states that the NCA is withdrawn from all forms of entry, appropriation, or disposal under the general land laws.

Direct/Indirect Effects

Because the NCA is withdrawn from all forms of entry, appropriation, and disposal, the impacts to Land Tenure from each of the alternatives would be the same. Land, water right and subterranean acquisitions would be the same as under all alternatives. These acquisitions would help accommodate resource management needs and could result in improved protection for all resources within the NCA.

xviii. ***Land Use Authorizations***

Affected Environment

A right-of-way (ROW) is an authorization to place facilities over, on, under, or through public lands for construction, operation, maintenance, or termination of a project. Public lands are made available throughout the planning area for ROWs and corridors. The NCA is in an exclusion area for major ROWs. Applications for minor ROWs would continue to be considered on a case-by-case basis after completing the appropriate level of NEPA analysis.

There is currently a utility corridor ROW for the Sierra Blanca Regional Airport that will be retained.

Direct/Indirect Effects

Minor ROWs would continue to be granted in certain areas and certain conditions under all of the management alternatives. Minor ROWs would be considered in cases that would improve access to the NCA for the BLM and the public.

Since the NCA is a ROW exclusion area, companies would have to find alternate routes for major projects (1997 RMP). Under all alternatives, minor ROWs within the NCA that are proposed to be of a height greater than 15 feet will be buried or prohibited. The effect would be that proponents of such projects might look for alternate routes instead of bearing the expense of burying the utility line. Proponents may also have new technology that would fit the criteria of a minor right-of-away, but would be able to install major ROW infrastructure.

xix. ***Cave Management***

Affected Environment

All federally-managed caves within the NCA are protected by the Cave Resource Protection Act of 1989 and other BLM policies and guidelines.

Fort Stanton Cave (FSC) is widely known for displays of rare velvet formations. The cave also contains displays of helictites, aragonite, selenite needles and various forms of gypsum. The velvet is located in the Upper Breakdown Room and Lake Room and the rear portions of the cave. Many formations have been destroyed deliberately by vandals and collectors, and accidentally, by careless visitors.

The Snowy River Passage gained its name by a continuous snow-white calcite on the passage floor. This unique formation and previously undiscovered bacteria have led to a heightened interest in the scientific community. Geomicrobiologists, mineralogists, geologists, and hydrogeologists from New Mexico Tech, University of New Mexico, New Mexico Bureau of Geology and Mineral Resources and the National Cave and Karst Research Institute have an interest in studying all scientific aspects of the Fort Stanton Cave. To date, several species of microorganisms that were previously unknown have been discovered.

A scientific geomicrobiological team from the New Mexico Institute of Mining and Geology (New Mexico Tech) and the University of New Mexico have been actively researching several aspects of Fort Stanton Cave/Snowy River Passage geomicrobiology, geology, mineralogy, and paleoclimatology:

- 1) Biodiversity and mineral-precipitating capability of the unusual microbiological communities inhabiting abundant black manganese-rich crusts on walls and ceilings,
- 2) Nature of the branching microbial communities on mud deposits
- 3) Potential for human use, e.g. pharmaceutical, industrial, or bioremediation.
- 4) BLM cave managers face an issue of protecting and preserving native microbial communities in the caves they administer, while allowing human access for exploration, science, & recreation.
- 5) Better understanding of cave and regional geology, and paleoclimatology of the area.

Dr. Boston from New Mexico Tech has isolated 36 strains of micro-organisms (actually groups of species) from the black manganese rich wall crusts. Extremely rapid growth and precipitation of manganese oxide minerals from these cultures has been confirmed. In other cave work, the team has found many manganese and iron-oxidizing microorganisms never previously described (Northup et al., 2003, Spilde et al. 2005). They have found many other novel strains indicating that cave microbial populations offer new insights into the microbial biodiversity. From 2003 and 2007 pilot studies on the microorganisms in black manganese crusts, resulted in the culture collection of the 36 isolates housed at the Geomicrobiology Lab at New Mexico Tech. These organisms are challenged to exhibit mineral precipitation capabilities under a wide array of conditions including temperature, nutrient content, mineral and metal composition, pH, and others in order to induce mineral precipitation of manganese, iron, or other metal rich minerals.

The processes of precipitation are studied to determine whether it is a passive process resulting from chemical changes in the environment brought about by organism activities or whether it is the result of active internal uptake of relevant metals and ions into the organisms' interiors and enzymatically processed. Selective inhibitors are used to block individual metabolic pathways to deduce which metabolism pathway may be implicated in the process. Stable isotopic fractionation of carbon and sulfur is analyzed in the mass spec isotopic lab at NMT. Additional studies on mud actinomycete colonies and moonmilk are also being undertaken using similar culture methodology.

Recent research by another investigator (Mallory, unpublished results) has demonstrated that microorganisms in caves produce chemicals that are very effective in killing cancer cells, demonstrating huge potential value of cave microbial communities. From other cave research,

Dr. Boston has shown that cave microorganisms have potential for bioremediation in sewage gas treatment (unpublished proprietary contract results). Bioremediation potential is assessed via uptake rate experiments conducted with isotopically tagged substrates measured with a scintillation counter.

Use of human-associated bacteria (Human Indicator Bacteria, HIB) as a monitoring tool provides a new way to assess relative degree of human impact in this and other caves. HIBs are those not normally present in caves unless there has been substantial impact by humans in terms of presence, activities, or pollution. Such microbes may compete with natural communities, damage or destroy mineral deposits, and deteriorate human constructs necessary for cave management and maintenance. Results from this research provide the basis for management decisions concerning limits of acceptable change (Lavoie & Northup, 2006).

Research by the University of New Mexico Department of Earth and Planetary Sciences to find out how geologic complexities in Fort Stanton Cave/Snowy River (FSCSR) are related to stratigraphy, mineralogy, and geochronology:

- 1) cave age and significant deposits and speleothems in the FSCSR system;
- 2) geologic history & conditions of formation and subsequent development,
- 3) mineralogy of Snowy River calcite formation and other mineral deposits in abundant black manganese-rich crusts on walls and ceilings.

The department uses geophysical dating methods to determine age of materials within Snowy River, and other Fort Stanton Cave areas. The information and data collected during the project will then be used to help manage and protect the karst resources associated with Fort Stanton-Snowy River Cave complex.

Questions have been raised by researchers about the sustainability of human populations in semi-desert regions of the southwestern United States. Information obtained from the Snowy River calcite deposit has the potential to provide a unique high-resolution record of past climate/rainfall variations in the arid southwest. An enhanced level of detail is necessary to determine the precise historical record of wet and dry cycles over the period of Snowy River mineral deposition. Previous investigators have conducted similar studies using speleothem (secondary cave mineral deposits) as proxies for Pleistocene and Holocene climate change in continental interiors (e.g., Polyak & Asmerom, 2001; Polyak et al., 2004; Spotl et al., 2002).

Results of studies will be published in open scientific literature, made available in specific briefing summaries to BLM personnel, and posted on the Karst Information Portal <http://www.karstportal.org/> Any relevant image databases will be posted on the IDEC website, an image cataloging and collaboratorium effort headed by D. Northup (UNM) and in the development and testing phase as of this writing.

Preliminary data from previous work indicates the Snowy River calcite deposit to be less than 1,000 years old. Researchers know from recent flooding that calcite is deposited in extremely thin layers and thus the system is an active, "living" deposit. This enables researchers to study new deposition processes as a key to interpreting the climatic, hydrological, and geochemical signals that this deposit contains. New Mexico Tech/National Cave & Karst Research Institute - serves as the lead institution. University of New Mexico has primary responsibility for the study,

overseeing collection and analyses of mineralogical samples. Facilities for radiometric age dating are utilized on a fee per sample basis.

Dating strategy involves oldest speleothem dating and relationship to climatology. Pebble gravels in Snowy River are dated using cosmogenic radionuclide ratios. Minerals of interest include extensive manganese and iron oxide and clay deposits some of which are probably related to cave development, moonmilk, and calcite rafts. Snowy River calcite cores collected in May 2008 are being carefully analyzed for geochronology, mineralogy, and possible microbial content. Additional cores are scheduled for collection in upcoming expeditions.

Fort Stanton Cave is the site of hibernating bat populations. The recent threat of white-nose syndrome, a fungus which disrupts the ability of hibernating bats and leads to death, is of concern at the Fort Stanton Cave. The method of spread is not fully understood at this time. Access to the cave for research may be restricted by the need to prevent the spread of white nose syndrome to the cave.

The termination of Snowy River has yet to be discovered and several side passages remain unexplored. The indications are Snowy River will continue in a southwesterly direction; as of May, 2013 two passages have been mapped under lands managed by the US Forest Service. Researchers gain access to Snowy River through a constructed access portal in the Don Sawyer Memorial Hall.

Survey trips to the end of Snowy River now take more than 33 hours and may become multi-day events. Mapping the passages of the Snowy River Complex may take several years to complete and the time to complete the microbiological survey is unknown.

In the event of a rescue in the far reaches of Snowy River South, rescue of an injured caver would take approximately 72 hours if not longer and depending on injury type.

Currently, the cave system exchanges air with the surface through the main entrance due to two mechanisms:

1. Barometric interchange. Air flows into the cave when the surface barometric pressure is higher than in the cave and air flows out of the cave when the surface barometric pressure is lower than the cave. Velocity of airflow tends to vary inversely with the diameter of the passages so that in large passage cross-sections the airflow is low and in smaller passages it may be significantly higher. Spot measurements at the main gate just inside the entrance have varied from 0.15 mph to 3 mph. Velocities as high as 20.5 mph have been reported at the constriction named the "Hair Dryer" in the Priority 7 passage. During times when surface barometric pressure is relatively stable for extended periods of time (days), there are often twice-daily airflow reversals due to the diurnal fluctuations in surface pressure due to atmospheric heating and cooling, particularly in the warmer seasons.
2. Density current interchange. During parts of the year when the surface air temperature is significantly lower than that in the cave, cold air flows into the cave along the floor and a corresponding warmer air current flows out along the roof particularly when the barometric pressure is not a factor. This results are cold air pooling in lower areas of the cave such as the main corridor. No measurements are available to quantify this type of airflow.

Table 5. Cave airflow measurements.

Velocity (ft/sec)	Cross section (ft ²)	Vol. (ft ³ /sec)	Description
8.8	0.7	6.2	Priority 7, first pinch, (Before digging), Corcoran 1970
2.0	1.5	3.0	Snowflake #3, 5' before end, Corcoran 1970
17.6	2.0	35.2	P7 Hair Dryer (Swartz, 2003)
15.8	2.0	31.6	P7 Hair Dryer (Swartz, 2001)
20.5	2.0	41.0	P7 Hair Dryer (Zannes trip, 2005)
7.3	40.0	292.0	SRS108 (Davis, 2003)
8.0	6.4	51.2	DSMH Dig, Env. Seal (open) McLean, 2007
2.9	7.5	21.8	DSMH Entry Pit (Corcoran, 2005)
2.2	9.5	20.9	Snowflake #3 (Corcoran, 2000)
1.8	26.0	46.8	Priority 7, near gate (Corcoran, 2000)
2.3	255.0	586.5	Main Gate (Corcoran, 2007)

There have been numerous reports of noticeable airflow throughout the Snowy River complex. It appears that the airflow is typical of a barometric interchange between the main cave system entrance and all other passages, including Snowy River. Airflow patterns suggest that there are no other significant entrances to the cave system to provide air interchange or, if such entrances exist, they are located at remote locations that have little effect on the observations made so far.

Airflow measurements are non-simultaneous spot measurements and only give approximate relative volumes or capacities for the passages observed. Airflow observations indicate bi-directional flow at all passage connections. This implies that the primary mechanism responsible for air movement is barometric pressure changes outside the cave resulting in a corresponding response by the cave system. The highest volume airflow observed is in the Snowy River South Passage, indicating potential for significant passage beyond the known extent. The airflow volume in this passage, as measured near survey station SRS108, is apparently greater than the sum of airflow from the known passage connections to the other parts of the cave system. This may be partially accounted for by leakage at other unknown passage connections or breakdown interfaces.

Airflow has been noticed in Snowy River North and in The Metro passages, but no measurements have been made and the reports do not mention strong airflow in these passages. Airflow volumes related to Snowy River have been estimated from spot measurements at a few locations in the Snowy River section. The preceding table gives a summary of those estimates. Also included is a single measurement at the main gate near the entrance of the cave system for comparison.

Direct/Indirect Effects

Science and survey trips under administrative permits exceed recreational permit limitations due to specialized needs related to research and the requirements to take equipment in or out of the cave. In the case of Snowy River, all persons leading expeditions have previously been to Snowy River and understand the need for great care in negotiating routes to minimize impacts. The administrative permits document the number of people visiting Snowy River Passage on expeditions. The expeditions, in turn document the impacts to the mineral deposits by those expeditions. Appendix 5 (Fort Stanton Cave Snowy River Research Visitation Protocol) will be followed during science and survey trips.

The BLM expects human caused impacts to the calcite deposits of Snowy River as discovery and survey expeditions continue. Examples of these impacts are mud accidentally tracked onto the calcite, cracks in the calcite caused by walking on thin deposits, and rubs or scrapes of the calcite resulting from crawling in narrow passages. Periodic flooding of Snowy River, such as the 2010 flood, may contribute to natural restoration by washing away mud and depositing new calcite over disturbed areas.

The natural entrance to the cave may be restricted in order to prevent the spread of the white nose syndrome to other bat populations. Other cave passages may be administratively closed due to flooding or other additional safety concerns. A cave portal would allow administrative access, bypassing these areas and providing year-round access to Snowy River. However, a new portal may not sufficiently protect the cave against the introduction of the fungus that causes white nose syndrome. More research on causal factors is needed, and until that time, all protocols for preventing white nose syndrome would need to be implemented to prevent contamination.

Alternatives A and C allow the construction of a portal (see Figure 1 in Appendix 2). Appendix 2 describes the parameters of constructing a portal. Further site-specific NEPA analysis will be conducted before a decision is made concerning constructing a portal.

There is evidence of ceiling collapse and rock fall throughout Fort Stanton Cave where the cave passages traverse strata of solution tubes. Since the construction is to be located in the limestone strata of the cave, the risk of collapse and rock fall is low.

A cave portal drilled into Snowy River would address human health and safety issues. As cave passages increase in length without any additional exits to the surface, the hazard to researchers and explorers increases. In the event of a medical emergency, a cave portal would facilitate evacuation.

Some benefits of the portal would be:

- Facilitate radio communications in rescue missions and insertion of medical supplies in the Snowy River passage.
- Facilitate insertion of water, food, and extraction of human waste and garbage.
- Allow for real time telemetry of cave environment, including determining whether Snowy River is flooded before a team accesses Turtle Junction.

- Allow for quicker extraction of injured caver thus gaining access to medical assistance. The portal will also allow for insertion of a medical team for an injured caver that could not be moved long distances due to injuries.
- Year round access without disturbing bat hibernation.

Constructing a portal to access Snowy River could alter the natural air flow in the cave system. Changes in the natural airflow could change the ecosystem of the cave, including causing detrimental effects to bat roosts and other cave fauna, and would have to be remediated to return the flow to a natural state. Additionally, the construction of a cave portal could result in an increased introduction of fungal spores, based upon the barometric interchange between the two sides of the portal. Monitoring to detect changes would be part of any plan to construct a portal.

The construction activities themselves could impact the cave through vibration and the introduction of dust and/or debris into the passages. Dust would be a short-term impact, its duration lasting as long as construction occurred. Vibration could dislodge fragile mineral deposits located in proximity to the portal.

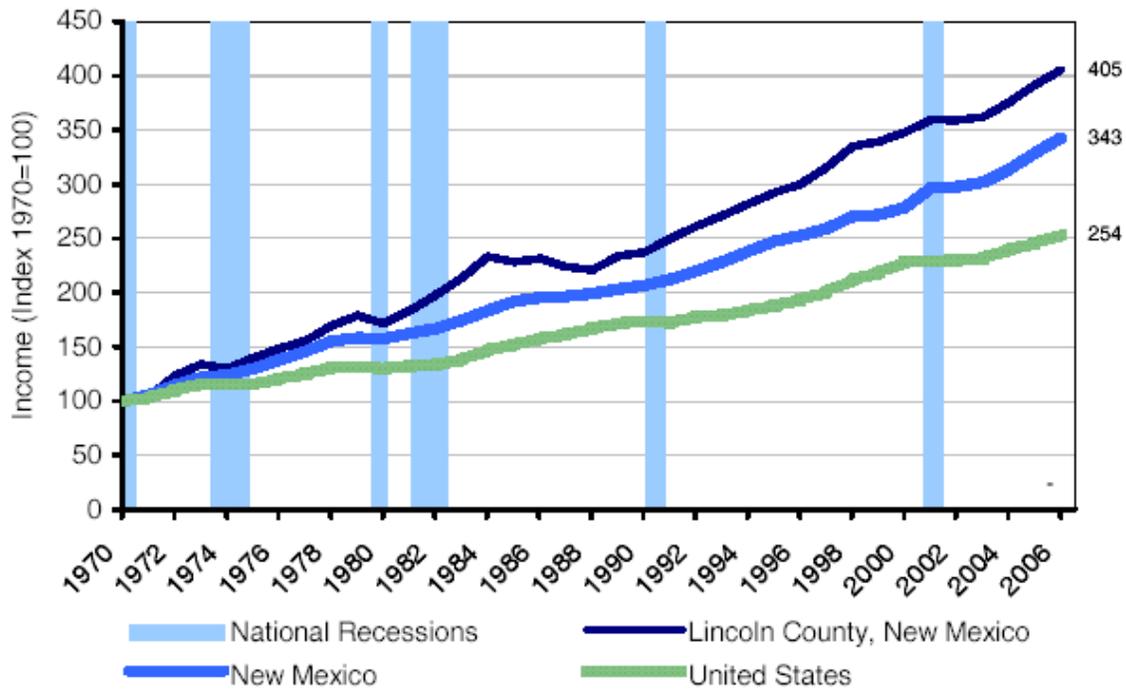
xx. ***Socio-Economics***

Affected Environment

The NCA is located in southern Lincoln County, New Mexico. The county is mostly rural in nature but includes the incorporated communities of Capitan, Carrizozo, Corona, Ruidoso and Ruidoso Downs. Over the period from 1970 to 2006, the population of the county grew 174 percent from 7,611 to 20,858, greatly outpacing the population growth of the state of New Mexico and the entire United States (BEA REIS 2006 Table CA30). The median population of the area has gotten older in the ten years between 1990 and 2000. The median age in 1990 was 37.2 and in 2000 it was 43.8.

Income growth in Lincoln County has outpaced the state and the country as well (Figure 2). The Standard Industrial Classification (SIC) System illustrates growth by category. Table 5 shows this classification of Lincoln County from 1970 to 2000. The fastest growing industry, by far, is the Services and Professional Industry, particularly Retail Trade and services such as health, legal and business services.

Figure 2. Income growth of Lincoln County compared to the state and the nation



Source: BEA REIS 2006 Table CA30

Table 6. County employment (jobs) by industry.

Industry	1970	2000	% of New Employment
Total Employment	3166.0	10536.0	
Wage and Salary Employment	2066.0	6684.0	62.7
Proprietors' Employment	1100.0	3852.0	37.3
Farm and Ag Services	591.0	648.0	0.8
Farm	549.0	476.0	
Ag Services	42.0	172.0	1.8
Mining	10.0	112.5*	1.4
Manufacturing (incl. forest products)	49.0	336.0	3.9
Services and Professional	1726.0	7255.5	75.0
Transportation & Public Utilities	106.0	332.0	3.1
TABLE 5. COUNTY EMPLOYMENT (JOBS) BY INDUSTRY - CONTINUED			
Wholesale Trade	34.0	123.5*	1.2
Retail Trade	619.0	2390	24.0
Finance, Insurance & Real Estate	306.0	1175.0	11.8
Services (Health, Legal, Business, Others)	661.0	3235.0	34.9
Construction	172.0	843.0	9.1
Government	618.0	1341.0	9.8

*Estimate.

Source: EPS 2009

Interestingly, a similar system used from 2001 to 2006, the North American Industrial Classification System (NAICS), showed that Construction was the fastest growing industry in Lincoln County during that timeframe (BEA REIS 2006 CD Table CA25N).

The employment described above generates personal income. Two ways to measure the quality of the jobs are per capita income and average earnings. Per capita income is calculated by dividing the total income by the total population. Average earnings are calculated by dividing total income by the number of workers. Although income growth in Lincoln County has outpaced the state and the country, the per capita income and average earnings of the county have remained below both the state and the nation (EPS, 2009). Table 6 shows a comparison of the per capita income and average earnings for Lincoln County between 1970 and 2006, adjusted for inflation.

Table 7. Changes in income in Lincoln County, New Mexico, and the U.S.

	TABLE 6. CHANGES IN INCOME			
	Lincoln County		New Mexico	United States
	1970	2006	2006	2006
Per Capita Income	\$16,419	\$24,281	\$29,929	\$36,714
Average Earnings Per Job	\$26,899	\$22,527	\$38,239	\$47,286

Direct/Indirect Effects

The NCA presents additional opportunities for public recreation within Lincoln County. The NCA surrounds the Fort Stanton State Monument and is approximately 10 miles west of the Lincoln State Monument. The NCA is approximately 5 miles east of Smokey Bear State Park in Capitan, New Mexico. Within Lincoln County there are two other BLM campgrounds and seven Forest Service campgrounds.

For 12 years the area was managed as an area of critical environmental concern and the prescriptions of this NCA plan generally continue the past management of the surface. The NCA designation and this plan neither close areas to uses by the public nor open areas previously closed to public use. The NCA would be an added attraction in Lincoln County but it would be difficult to measure the effect on the local economy. Therefore, the designation and management of the NCA would be expected have no net effect on the communities and economy of Lincoln County.

IV. CUMULATIVE IMPACTS

A cumulative impact is 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

The direct and indirect impacts of this proposed plan have been documented in each use or issue. By adopting much of the current land use planning decisions into this NCA plan, few if any additional impacts would be expected.

No noticeable impacts on the environment would result from the environmental impact of all other actions from table 1 when added to other past, present, and reasonable foreseeable future actions.

The population of Lincoln County has been increasing steadily over the last forty years, as noted in Section T, Socio-Economics. This increase in population has led to increased housing developments. Much of the private land to the west of the NCA is subdivided for current or future residential housing. In some cases these, houses are adjacent to the NCA boundary.

Housing developments on private, municipal, state, and other federal land, and the associated need for surface water and groundwater rights and uses might impact the existing BLM public surface water and groundwater rights, supplies and water resources in the NCA. Fort Stanton Cave and the Snowy River Passage have experienced periods of water flow through the cave system. The formation of the calcite, which gives Snowy River its name is the result of water flow through the cave. An increase in the number of domestic and municipal groundwater wells or increased pumping from these wells may reduce the amount of water flow through the cave system. The cumulative effect of increased groundwater pumping in the area from private, municipal, state, or other federal land might impact the existing BLM public surface water, and groundwater rights, supplies, and water resources located in the NCA.

Currently, the Village of Capitan has three municipal groundwater wells permitted on the NCA and these groundwater wells could affect BLM public surface water and groundwater rights, supplies and water resources in the NCA. In New Mexico water rights are administered by the OSE. The mission of the OSE is to protect and manage the water resources of New Mexico for beneficial use by its people, in accordance with law. The BLM monitors existing surface water and groundwater rights and new applications or new appropriations of surface water and groundwater rights filed with the OSE that could affect BLM public surface water and groundwater rights, supplies and water resources in the NCA.

Fort Stanton Historic Military Installation is a designated a monument by the New Mexico State Monuments. *The Fort Stanton-Snowy River Cave* NCA is one of several other national designations within Lincoln County and southern New Mexico. The nearby Capitan Mountain and White Mountain Wilderness Areas are managed by the Lincoln National Forest. Within a two-hour drive is White Sands National Monument and within a three-hour drive is Carlsbad Caverns National Park, both managed by the National Park Service. The BLM does not anticipate a sharp influx of visitors because of the NCA designation.

V. BLM TEAM MEMBERS

<i>Team Member</i>	<i>Title</i>
Mike Bilbo	Cave Specialist/Outdoor Recreation Planner
Jerry Dutchover	Geologist
Rebecca Hill	Archaeologist
Dan Baggao	Wildlife Biologist
Randy Howard	Wildlife Biologist
Jeremy Iliff	Archaeologist
Monica Ketcham	Writer/Editor
Angel Mayes	Assistant Field Manager, Lands and Minerals
Michael McGee	Hydrologist
Bill Murry	Recreation Planner
Adam Ortega	Range Management Specialist
Jerry Dutchover	Assistant Field Manager to Resources
Glen Garnand	Planning and Environmental Coordinator
Knutt Peterson	GIS Specialist
Glen Pugh	Civil Engineer
Randy Vinson	Range Management Specialist
Philip Watts	GIS Specialist
Allen Wyngaert	Fire Management Specialist
Ruben Sanchez	Realty Specialist

VI. PERSONS, GROUPS, AND AGENCIES CONSULTED

U.S. Forest Service, Lincoln National Forest, Smokey Bear District
 U.S. Park Service, Carlsbad Caverns National Park
 New Mexico Department of Game and Fish
 Lincoln County Commission
 New Mexico Institute of Mining Technology - Dr. Penny Boston, Geomicrobiologist
 National Cave and Karst Research Institute, Dr. George Veni
 University of New Mexico
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 Earth and Planetary Sciences Department - Drs. Victor Polyak and Yemani Asmerome,
 Mineralogists
 New Mexico Bureau of Geology and Mineral Resources - Dr. Talon Newton, Hydrogeologist
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 National Cave and Karst Research Institute - Dr. Lewis Land, Research Hydrogeologist,
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 Conservation Lands Fund

Ecoservants - Stephen Carter
American Endurance Ride Conference
Comanche Nation
Isleta Pueblo
Ysleta del Sur Pueblo
Mescalero Apache
Kiowa Tribe of Oklahoma
Jan Biella, Acting State Historic Preservation Officer
Debbie Buecher, Bat Biologist

VII. LITERATURE CITED

- Baker, Tracey, et al., 2008, Snowy River Access Design Final Report, New Mexico Tech
- Buecher, Debbie C., 2006. Preliminary Study of the Bats of Lincoln County, N.M.: Results of Netting and Acoustic Sampling, May & July 2005. Wildlife and Fisheries Program, University of
- Arizona, January. (Bilbo note - this reference is relevant as this work was completely done on Fort Stanton ACEC)
- Bucher, Debbie C., 2009. Fort Stanton Cave Survey Project: Results of Bat Monitoring, 25 April-2 May. Buecher Wildlife Consulting, Tucson.
- Bucher, Debbie C., 2009. Bat Research at Fort Stanton National Conservation Area. September 2009 Expedition, Buecher Wildlife Consulting, Tucson.
- Buecher, Debbie. 2010. Draft Bat Management Plan, Fort Stanton – Snowy River Cave National Conservation Area. June 2010. Buecher Wildlife Consulting, Tucson, February.
- Bucher, Debbie C., 2010. Analysis of Roost Microclimate in Nine Bat Hibernacula Across New Mexico. White Nose Syndrome Monitoring, Buecher Wildlife Consulting, Tucson, AZ 85715, June.
- Commission on Karst Hydrogeology and Speleogenesis, 2011. *Glossary of Karst and Cave Terms*. <http://network.speleogenesis.info/directory/glossary/index.php>
- Corcoran, John J III and Peerman, Steve, Fort Stanton Cave Study Project. 2009-2011. *Personal Communication with BLM Cave Specialist Mike Bilbo*.
- Davis, D. J. and Land, L., 2006. "Recently Discovered Passages in Fort Stanton Cave, New Mexico, and Implications for Speleogenesis & Regional Geomorphic Processes in the Northern Sacramento Mountains." *Caves and Karst of Southeastern New Mexico*: New Mexico Geological Society, Guidebook 57.
- Di Tomaso, Joseph M., 1998. Impact, biology, and ecology of saltcedar (*Tamarix* spp.) in the Southwestern United States. *Weed Technology*, Vol 12, pp. 326-336.
- Environmental Profile System (EPS). A SocioEconomic Profile: Lincoln County, New Mexico. February 13, 2009. (Available on Internet: http://www.headwaterseconomics.org/profiles/p_Lincoln_County_New_Mexico.pdf)
- Federal Register, 1993. "[NM-060-4340-02] Closure and Restriction Order: Roswell Resource Area Bat Hibernacula." 58 FR No. 179, 48668-48669, September 17, 1993, U.S. Government Printing Office.
- Hughes, Kaitlyn, Department of Biology, University of New Mexico, 2009-2011. *Personal Communication with BLM Cave Specialist Mike Bilbo*.

- Kunkel, K. E. 1984. Temperature and precipitation summaries for selected New Mexico locations. New Mexico Department of Agriculture. 190 pp.
- Land, L., 2007. "Preliminary Results of Surface and Subsurface Water Chemistry Sampling in the Vicinity of Fort Stanton Cave, Lincoln Co., NM. *National Speleological Society-Southwest Region, Winter Technical Meeting*, Las Cruces, NM.
- Land, Lewis, Ph.D., Research Hydrogeologist, National Cave and Karst Research Institute. 2009-2011. *Personal Communication with BLM Cave Specialist Mike Bilbo*.
- Land, L. & Newton, B. T., 2008. "Seasonal and Long-Term Variations in Hydraulic Head in a Karstic Aquifer: Roswell Artesian Basin, New Mexico." *Journal of the American Water Resources Association*, v. 44.
- Lavoie, K.H. and Northup, D.E. 2006. In: *Proceedings of the 17th National Cave and Karst Management Symposium*, October 31 to November 4, 2005, Albany, New York
- Mallory, L.M., Dahm, Boston, P.J., Spilde, M.N., Northup, D.E., Melim, L.A., Soroka, D.S., Kleina, L.G., Lavoie, K.H., Hose, L.D., C.N., Crossey, L.J., and Schelble, R.T. *Personal Communication, the NCKMS Steering Committee*. 2001.
- McMillan, Cameron, Department of Biology, University of New Mexico, 2009-2011. *Personal Communication with BLM Cave Specialist Mike Bilbo*.
- Miller, Richard F., Tony J. Svejcar, and Jeffrey A. Rose, 2000. Impacts of western juniper on plantcommunity composition and structure. *Journal of Range Management*, Vol. 53, pp. 574-585.
- Mourant, W. A., 1963, Water Resources and Geology of the Rio Hondo Drainage Basin Chaves, Lincoln, and Otero Counties, New Mexico., and Kelley, V. C., 1971, Geology of the Pecos country southeastern New Mexico.
- Northup, Diana, PhD, Visiting Associate Professor, Department of Biology, University of New Mexico, 2009-2011. *Personal Communication with BLM Cave Specialist Mike Bilbo*.
- Northup, D.E., Barns, S.M., Yu, Laura, E., Spilde, M.N., Schelble, R.T., Dano, K.E., Crossey, L.J., Connolly, C.A., Boston, P.J., and Dahm, C.N. 2003. "Cave Biosignature Suites: Microbes, Minerals and Mars." *Astrobiology Journal* 1(1):25-55.
- Palmer, Arthur N., 2007. *Cave Geology*. Cave Books, Dayton, Ohio, P. 21
- Palmer, Arthur N. and Margaret V., Editors, 2009. *Caves and Karst of the USA*. National Speleological Society, Inc., Huntsville, Alabama.
- Polyak, V. J. & Asmerom, Y., 2001. "Late Holocene Climate and Cultural Changes in the Southwestern United States." *Science*, v. 294.
- Polyak, V. J., Rasmussen, J. B. T., & Asmerom, Y., 2004. "Prolonged Wet Period in the Southwestern United States through the Younger Dryas." *Geology*, v. 32.
- Polyak, Victor, PhD, Department of Earth and Planetary Sciences, 2009-2011. *Personal Communication with BLM Cave Specialist Mike Bilbo*.

- Rawling, G.C., 2009, Geology of the Ruidoso Area, Lincoln and Otero Counties: New Mexico, New Mexico Bureau of Geology and Mineral Resources, Open-File Report OFR-507, Scale 1:24,000
- Rawling, G. C., Timmons, S., Johnson, P., Walsh, P., Land., L., Timmons, M., and Felix, B., 2007. "Sacramento Mountains Hydrogeology Study." *Progress Report, July, 2007-New Mexico Bureau of Geology and Mineral Resources Aquifer Mapping Program, Socorro.*
- Shelley, Phillip H., Kristen E. Wenzel (et. al.), 2002. *Archaeological Variation within the Middle Rio Bonito*. Vol. 4. Bureau of Land Management, New Mexico State Office, Santa Fe, New Mexico
- Spilde, M.N., Kooser, A., Northup, D.E., Boston, P.J., Provencio, P., and Polyak, V., 2010. "Mineralogical Studies in Snowy River Passage, Ft. Stanton Cave, New Mexico." *Decade of Discovery: NLCS Science Symposium*. May 2010. Albuquerque, NM.
- Spilde M.N., Northup D.E., Boston P.J., et al. (2005). "Environmental Microbiology." *Geomicrobiology Journal* 5(11): 1071-1086. 22, 99-116.
- Spilde, Michael N., Manager, Microprobe/SEM Laboratories, Institute of Meteoritics, University of New Mexico. 2009-2011. *Personal Communication with BLM Cave Specialist Mike Bilbo*. U.S. Department of Interior, Bureau of Land Management, Roswell Field Office. 2007. EA #NM510-2007-0166, Snowy River Access, October 2007.
- U.S Department of Interior, Bureau of Land Management, Roswell Resource Area. 1990. Ft. Stanton Habitat Management Plan NM-6-WHA-T5.
- U.S. Department of Agriculture, A Soil Conservation Service, 1983. Soil survey of Lincoln County Area, New Mexico. 217 pp.
- Veni, George, Ph.D. Executive Director, National Cave and Karst Research Institute. 2009-2011. *Personal Communication with BLM Cave Specialist Mike Bilbo*.
- Werker, Val Hildreth and Jim C., 2006. *Cave Conservation and Restoration*. National Speleological Society, Inc., Huntsville, Alabama.
- Whitson, Tom D. et al. 2009. Weeds of the West: 9th Edition. Published by The Western Society of Weed Science in Cooperation with the Western United States Land Grant Universities Cooperative Extension Services.