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

DOI-BLM-NM-P010-2010-149-EA

Lincoln County, NM
August 23, 2013

U.S. Department of the Interior
Bureau of Land Management
Roswell Field Office
Roswell, New Mexico

BLM

New Mexico Roswell Field Office

NATIONAL CONSERVATION LANDS

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
New Mexico State Office
P.O. Box 27115
Santa Fe, New Mexico 87502-0115
www.blm.gov/nm

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

1610 (P0120)

August 23, 2013

Dear Reader:

The Bureau of Land Management (BLM) Roswell Field Office has completed the Proposed Resource Management Plan Amendment /Environmental Assessment (RMP Amendment/EA) for the Fort Stanton-Snowy River National Conservation Area (NCA). The Proposed RMP Amendment/EA was prepared by the BLM in consultation with various government agencies and organizations, taking into account public comments received during this planning effort. The purpose of the RMP Amendment is to amend the 1997 Roswell RMP to provide the framework for managing the subsurface and surface resources of the NCA. The need of the Proposed RMP Amendment is to comply with the Omnibus Public Land Management Act of 2009 (Public Law 111-11), Subtitle C, Section 2202. The Proposed RMP Amendment/EA is available on the Roswell Field Office website at http://www.blm.gov/nm/roswell.

Pursuant to BLM's planning regulations at 43 CFR 1610.5-2, any person who participated in the planning process for this Proposed RMP Amendment and has an interest which is or may be adversely affected by the planning decisions may protest approval of the planning decisions contained therein. The Proposed RMP Amendment/EA is open for a 30-day protest period beginning August 23, 2013.

For further information on filing a protest, please see the accompanying protest regulations in the pages that follow (labeled as 1 Enclosure). The regulations specify the required elements of your protest. Take care to document all relevant facts. As much as possible, reference or cite the planning documents or available planning records (e.g., meeting minutes or summaries, correspondence, etc.).

Emailed protests will not be accepted as valid protests unless the protesting party also provides the original letter by either regular mail or overnight delivery postmarked by the close of the protest period. Under these conditions, the BLM will consider the emailed protest as an advance copy and will afford it full consideration. If you wish to provide the BLM with such advance notification, please direct emailed protests to: Brenda_Hudgens-Williams@blm.gov.

All protests must be in writing and mailed to one of the following addresses and must be postmarked on or before September 22, 2013.

Regular Mail:
Director (210)
Attention: Brenda Hudgens-Williams
P.O. Box 71383
Washington, DC 20024-1383

Overnight Delivery:
Director (210)
Attention: Brenda Hudgens-Williams
20 M Street SE., Room 2134LM
Washington, DC 20003

Before including your address, phone number, email address, or other personal identifying information in your protest, be advised that your entire protest – including your personal identifying information – may be made publicly available at any time. While you can ask us in your protest to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

The BLM Director will make every attempt to promptly render a decision on each protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior on each protest.

Responses to protest issues will be compiled and formalized in a Director's Protest Resolution Report made available following issuance of the decisions.

Upon resolution of all land use plan protests, the BLM will issue a Decision Record (DR). The DR will be available to all parties at the Roswell Field Office webpage at http://www.blm.gov/nm/roswell.

Unlike land use planning decisions, implementation decisions included in this Proposed RMP Amendment/EA are not subject to protest under the BLM planning regulations, but are subject to an administrative review process, through appeals to the Office of Hearings and Appeals, Interior Board of Land Appeals pursuant to 43 CFR, Part 4 Subpart E. Implementation decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed. Where implementation decisions are made as part of the land use planning process, they are still subject to the appeals process or other administrative review as prescribed by specific resource program regulations once the BLM resolves the protests to land use planning decisions and issues a DR.

Sincerely,

Jesse Juen
State Director

Enclosure

Protest Regulations

[CITE: 43CFR1610.5-2]

TITLE 43--PUBLIC LANDS: INTERIOR
CHAPTER II--BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR
PART 1600--PLANNING, PROGRAMMING, BUDGETING--Table of Contents
Subpart 1610--Resource Management Planning
Sec. 1610.5-2 Protest procedures.

(a) Any person who participated in the planning process and has an interest which is or may be adversely affected by the approval or amendment of a resource management plan may protest such approval or amendment. A protest may raise only those issues which were submitted for the record during the planning process.

(1) The protest shall be in writing and shall be filed with the Director. The protest shall be filed within 30 days of the date the Environmental Protection Agency published the notice of receipt of the final environmental impact statement containing the plan or amendment in the Federal Register. For an amendment not requiring the preparation of an environmental impact statement, the protest shall be filed within 30 days of the publication of the notice of its effective date.

(2) The protest shall contain:

(i) The name, mailing address, telephone number and interest of the person filing the protest;
(ii) A statement of the issue or issues being protested;
(iii) A statement of the part or parts of the plan or amendment being protested;
(iv) A copy of all documents addressing the issue or issues that were submitted during the planning process by the protesting party or an indication of the date the issue or issues were discussed for the record; and
(v) A concise statement explaining why the State Director's decision is believed to be wrong.

(3) The Director shall promptly render a decision on the protest.

(b) The decision shall be in writing and shall set forth the reasons for the decision. The decision shall be sent to the protesting party by certified mail, return receipt requested. The decision of the Director shall be the final decision of the Department of the Interior.

1 Enclosure

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

DOI-BLM-NM-P010-2010-149-EA

FINDING OF NO SIGNIFICANT IMPACT:

I have determined that the BLM Preferred Alternative (Alternative A), as described in the Environmental Assessment (EA) will not have any significant impact, individually or cumulatively, on the quality of the human environment. Because there would not be any significant impact, an environmental impact statement is not required. The NEPA handbook (p. 83) indicates that the FINDING OF NO SIGNIFICANT IMPACT (FONSI) must succinctly state the reasons for deciding that the action will have no significant environmental effects. It also recommends that the FONSI address the relevant context and intensity factors.

In making this determination, I considered the following factors:

1. The activities described in the BLM Preferred Alternative (Alternative A) do not include any significant beneficial or adverse impacts (40 CFR 1508.27(b)(1)). The EA includes a description of the expected environmental consequences.

2. The activities included in the proposed action would not significantly affect public health or safety (40 CFR 1508.27(b)(2)).

3. The proposed activities would not significantly affect any unique characteristics (40 CFR 1508.27(b)(3)) of the geographic area such as prime and unique farmlands, caves, wild and scenic rivers, designated wilderness areas or wilderness study areas.

4. The activities described in the proposed action do not involve effects on the human environment that are likely to be highly controversial (40 CFR 1508.27(b)(4)).

5. The activities described in the proposed action do not involve effects that are highly uncertain or involve unique or unknown risks (40 CFR 1508.27(b)(5)).

6. My decision to implement these activities does not establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration (40 CFR 1508.27(b)(6)).

7. The effects of the proposed action would not be significant, individually or cumulatively, when considered with the effects of other actions (40 CFR 1508.27(b)(7)). The EA discloses that there are no other connected or cumulative actions that would cause significant cumulative impacts.

8. I have determined that the activities described in the proposed action will not adversely affect or cause loss or destruction of scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)).

9. The proposed activities are not likely to adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (40 CFR 1508.27(b)(9)).

10. The proposed activities will not threaten any violation of Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10)). Page 15 of the EA describes the conformance with land use plans and relationships to statutes, regulations, or other plans.

APPROVED:

Jesse Juen
State Director

8/21/13
Date

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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

The Omnibus Public Land Management Act of 2009 (Public Law 111-11), Subtitle C, Section 2202 established the Ft. Stanton-Snowy River Cave NCA *"to protect, conserve, and enhance the unique and nationally important historic, cultural, scientific, archaeological, natural, and educational subterreanean cave resources of the Fort Stanton-Snowy River cave system."* These resources and values for which the NCA was established are referred to as "*NCA objects*." Part of the NCA planning process is to provide more specific definitions of these NCA objects. These are provided below.

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: 1. Biodiversity and mineral-precipitating capability of the unusual microbiological

	paleoclimatological resources.	communities inhabiting abundant black manganese-rich crusts on walls and ceilings. 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.

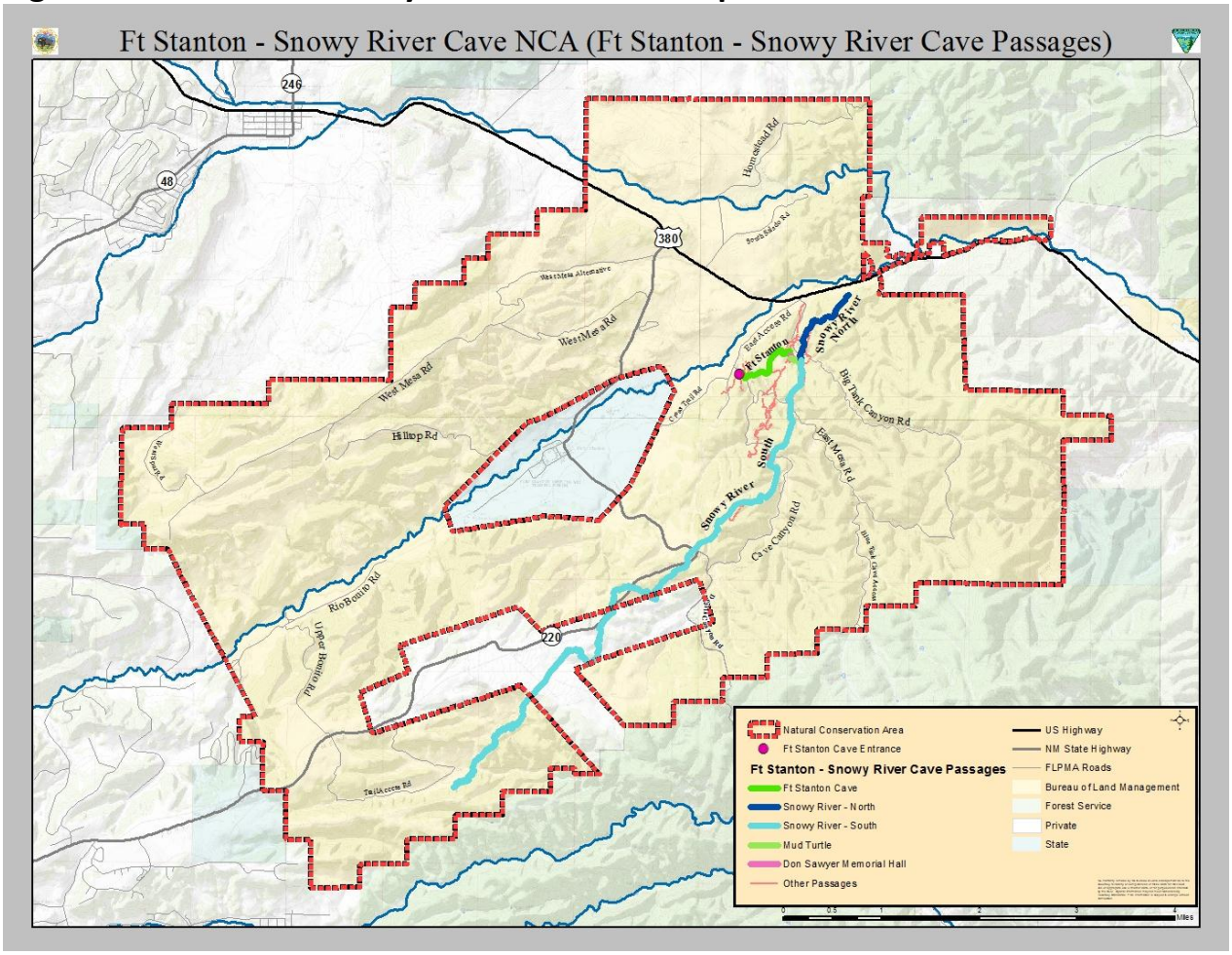
The need for this plan is to comply with PL 111-11, in which Congress mandated that the BLM develop a comprehensive plan to manage the NCA. PL 111-11 established the NCA to protect, conserve, and enhance the unique and nationally important historic, cultural, scientific, archaeological, natural, and 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 mange new applications for Land Use Authorizations
- National Wild and Scenic River Systems (NWSR
  - How would rivers eligible for inclusion in the NWRS would 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*

<u>All alternatives considered in the NCA Plan are consistent with:</u>

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.

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

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). *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.*	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 NE¼SE¼ of Section 10 and the N½N½SW¼ 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 NE¼NW¼SW¼ 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 S½SW¼NW¼, and the NW¼NW¼SW¼of Section 11 and the NE¼SE¼ 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 SE¼SW¼NW¼ of Section 11, Township 10 South, Range 14 East, and through the SW¼SE¼NW¼ and the NW¼NE¼SW¼ 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 S½SW¼NW¼, the NW¼NW¼SW¼ of Section 5 and the NE¼SE¼ 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, NE¼SE¼;
Sec. 11, S½NW¼ and N½SW¼.

New Mexico Principal Meridian

T. 10 S., R. 15 E.,
Sec. 05, SE¼NW¼ and NW¼SW¼;
Sec. 06, NE¼SE¼.

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-feet 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 studes were available. The initial information for the research indicates that the genus Geomyces in 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 is 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 costal 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 leucoccephalus*)

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 accidently, 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 interested 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 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 spleothem (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 cataloguing 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.

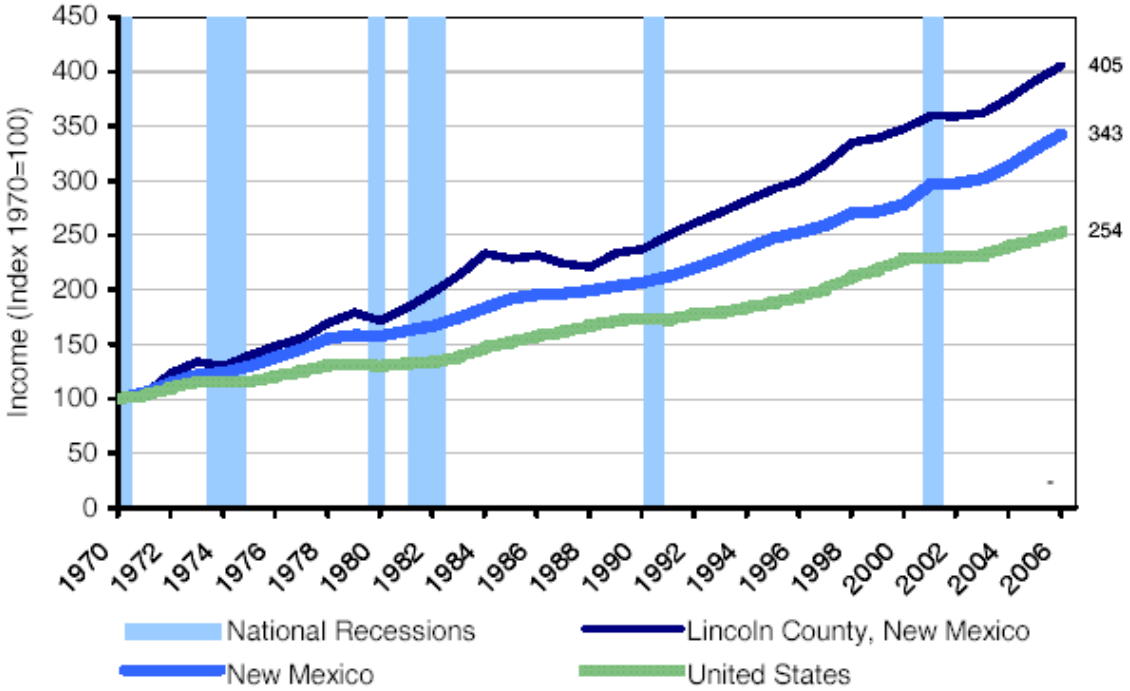
xx. ***Socio-Economics***

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

Team Member	*Title*
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
Biology Department - Dr. Diana Northup, Geomicrobiologist
Earth and Planetary Sciences Department - Drs. Victor Polyak and Yemani Asmerome, Mineralogists
New Mexico Bureau of Geology and Mineral Resources - Dr. Talon Newton, Hydrogeologist
Fort Stanton Cave Study Project
National Cave and Karst Research Institute - Dr. Lewis Land, Research Hydrogeologist,
Microprobe/SEM Laboratories, Institute of Meteoritics, University of New Mexico - Michael N. Spilde, Manager
National Speleological Society
Socorro Backcountry Horsemen
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 Sydrome 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, NewMexico 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.

APPENDIX 1

DISCOVERY AND DOCUMENTATION PROCEDURES IN FOR ALL CAVES IN THE FORT STANTON-SNOWY RIVER CAVE NATIONAL CONSERVATION AREA

The following procedures were analyzed in EA No. NM-060-2003-113 and are carried forward in the Fort Stanton-Snowy River Cave NCA Plan.

1.0 Discovery, Entry and Documentation of New Passages and Features in BLM Roswell Field Office Permitted Caves

1.1 Introduction

"Modern day" cave exploration and surveying began in the 1960's with the advent of the Guadalupe Cave Survey in the Carlsbad region. Recent management has increasingly relied on accurate and complete survey and inventory notes. In addition, no one may enter unexplored or unsurveyed passages without surveying as they go. There are many passages that have been "scooped," but not surveyed. In order to avoid further abuse by relatively few individuals, everyone must adhere to this policy.

1.2 Exploration Policy

The Roswell Field Office BLM Cave Program supports the discovery and careful documentation of additional new, pristine sections of Fort Stanton Cave and other Roswell Field Office caves. Although repeatedly visited, documentation of pristine resources has not been complete. Discovery of new passages may be highly significant and provide important scientific and resource data regarding cave speleogenesis. Research and dig projects, however, be authorized only after completion of the NEPA process, including compliance with the National Historic Preservation Act. After the NEPA process is complete, the BLM issue permits in support of projects, with provisions that guidelines and stipulations be closely followed.

1.3 Dig Project Members are not Volunteers

The Roswell Field Office Cave Program recognizes and credits persons who discover new passages, providing them the opportunity to document their discovery, utilizing cave evaluation and classification techniques. Therefore dig project members not be covered under volunteer agreements during exploratory digs. BLM policy prohibits placing volunteers in hazardous situations such as digging.

1.4 Discovery

Upon passage discovery, volunteer agreements are developed between BLM and discoverers/explorers after all dug passage is stabilized and an environmental closure emplaced. BLM cave managers are involved in close coordination with the discovery party, and actively participate in planning, documentation, mapping and research.

1.5 Rules for Survey and Discovery

A. Permitted caves are withdrawn from public entry except by permit to protect very fragile, very sensitive areas and resources. Digging, breaking or altering formations, or enlarging any passage(s) requires permission from the BLM authorizing official or designated representative.

B. BLM permitted caves are managed with orientation to a strong conservation mandate. It is essential that everyone do whatever possible to minimize their impacts to BLM caves.

C. No one is permitted to explore new or unsurveyed passages in any of the BLM permitted caves, until consultation with BLM representatives has occurred and methods and techniques of discovery agreed upon by all parties.

D. Survey is a required activity that must be done in conjunction with exploration. Looking at (scooping) passages without surveying them is totally unacceptable and will not be tolerated.

E. Breaking a trail through ultra-sensitive areas, such as aragonite bushes is strictly prohibited. You are required to notify the Cave Program so the BLM can be involved in making a decision of such magnitude. This also includes wading in, swimming through, or disturbing any newly found pools.

1.6 Cave Entry Guidelines

The reason for these guidelines in a discovery situation is to allow limited access for scientific research, survey when in association with exploration, and BLM management related trips while impacting the cave as little as possible. Of primary importance are the impacts to the cave and the safety of all who enter.

1.7 Before Entering the Cave

A. Everyone must sign a permit.

B. Project/trip leaders are ultimately responsible for the personnel on their trip. Leaders shall do their best to recruit cavers that are going to follow these guidelines that have been established.

C. Every team entering a permitted cave shall have one designated team leader. Team leaders are responsible for the safety of their team and for the actions of their team members. If a team member is acting in an unsafe manner or not being careful and actually causing more damage to the cave, then it is the team leader's responsibility to correct that person's actions. If problems persist, then the team leader must abort the trip and have the team leave the cave. A team leader shall gear team activities to the least experienced member of the team. This pertains to speed of travel as well as climbing abilities. A team shall also stay together unless an emergency requires different actions.

D. Everyone entering the cave is responsible for their actions while in the cave. They are also responsible for reporting to the team leader, acts that are unsafe or damaging to the cave by other team members. The overall goal is to allow access to the cave while minimizing all impacts. It is everyone's responsibility to assure that the cave remains as pristine as possible and that each team member is very safety aware while in the cave.

E. Clothing, boots and caving gear shall be clean before entering the discovery section to minimize the introduction of foreign bacteria, molds and fungi.

F. Boots must have non-marking soles. If you are in doubt, scrape boot over white floor or limestone rocks.

G. Carbide lamps are no longer warranted in the NCA caves. Most of the old carbide dumps in Fort Stanton Cave have been cleaned up. But there remains the potential, should someone dump carbide - of definite adverse impact on cave-adapted invertebrates. Current LED and battery technology offer far better lighting than ever before, and therefore electric lighting use is required, while carbide is prohibited, except for a highly controlled activity of historical documentation through the use of a living history scenario.

1.8 Accidents, Illegal Entry, Vandalism in Progress, Lock Problems

For any accident of a serious nature, such as death or injury requiring rescue or body recovery, a strict protocol follow with existing valid current phone numbers and emails listed on the permit: **Emergency** (cave rescue, serious injury, death): In this order - call

- NM State Police SAR Resource Officer cell #, email
- NM State Police SAR Area Commander/Field Coordinator cell #, email
- NM State Police Field Coordinator cell #, email
- BLM Cave Specialist/Manager cell #, email
- BLM Roswell Field Manager cell #, email
- BLM Ranger, cell #, email
- White Mtn. Search & Rescue cell #, email

If none of the above can be reached - BLM 24-HOUR Interagency Dispatch 1-877-695-1663 (tell the dispatcher to send State Police).

Illegal Entry or Vandalism in Progress call Sheriff 575-648-2341 & BLM Ranger cell #, email

Lock/Combination Problems, Cave Manager cell #, email.

- Other numbers to try:
- Outdoor Recreation Planner cell #, email,
- BLM Valley of Fires Recreation Area at 575-648-2241.
- Cave Program Volunteers
  Cell #, email (Fort Stanton, Torgac's, Crockett's caves),
  Cell #; email (Fort Stanton Cave),
  Cell #; email (Fort Stanton, Torgac's, Crockett's caves)

1.9 Trip/Progress Reports

Team leaders are required to fill out trip report forms and return it to our Cave Program office within two weeks following each work session. The reports include the date, personnel, places visited and work accomplished including specifics such as types of information or samples collected. If survey was the objective, list the station numbers that were set. The team leader shall submit a preliminary report on the permit post-use report, followed by a formal report no later than two weeks after the session.

1.10 Traveling Through the Cave

A. All teams must have a minimum of three people. Survey and exploration teams can have no more than four members on a team unless given specific permission by the Cave

Specialist. Science and management related teams are limited to no more than 6 members on a team unless given specific permission by the Cave Specialist.

B. All solid and liquid wastes must be carried with you and out of the cave without exception. Burrito bags or urine bottles may not be left along the trail to be picked up on the way out because they may be forgotten about and someone else may have to retrieve them.

C. No smoking of tobacco or other products and no consumption of alcohol in the cave.

D. If a vertical situation is encountered, everyone entering the cave is responsible for the care and protection of all ropes and the subsequent rigging that is utilized. Wear spots or other problems shall be brought to the attention of the trip leader, who if necessary, shall fix the problem immediately or notify the Cave Program of their concerns. Ropes shall not be re-rigged without permission from the Cave Manager unless an immediate threat is perceived. Please notify our Cave Manager Office of any changes or if a potential problem is noticed. If possible, leave a note for other expedition members explaining the change in rigging and why it was necessary.

1.11 Trails and Trail Markers

The BLM is very concerned about the preservation of all the resources in the cave. All exploration team members are cautioned to be very careful. In the past, "conservation", and "resource" were not words associated with caves, consequently, BLM permitted caves have "Impact Trails" throughout. The Cave Program is trying to establish only one trail through all areas of these caves. Please stay on these established trails. During exploration stages, pick the trail of least damage and mark it immediately and carefully. When traveling through the cave, stay on established trails. Reflectors were installed to focus the bulk of visitor traffic on the "Impact Trail." All team members shall be aware of these and re-site them when they get knocked over.

1. Green is the route in.

2. White is the way out of the cave.

Other reflectors used are:

1. Red - mark areas that are off limits;

2. Blue – mark Cave Radio Stations (and thus the corresponding surface station directly above. RFO GIS, Fort Stanton Cave Study Project and White Mountain Search and Rescue all have maps that pinpoint the surface locations that are directly above blue reflector radio stations.

If trails are hard to see, either re-flag them immediately or notify the Cave Program representatives so that BLM know of the problem. Flagging use in the permitted caves are as follows:

a. Orange for marking most trails.
b. White for Snowy River Pool Deposit Center Trail
c. Diagonal White & Blue Stripes denote sensitive areas such as gypsum crust, aragonite etc.
d. Diagonal White & Red Stripes denote off-limits areas.

e. Blue, is utilized for survey stations

When flagging a trail, use plenty of flagging tape and flag both sides. This helps keep the trail as narrow as possible.

Crystal Crawl is rock-lined 36-inch wide trail which is just over adult body width, again to focus movement on the center impact trail and preserve areas where gypsum needles are regrowing.

1.12 Attitude, Behavior and Conduct

Carelessness and disregard for resources has taken place in permitted caves over many decades. With today's knowledge about resource protection, there is no excuse for needless damage to cave resources. Intentional damage to make it easier to move through certain areas be treated as serious violations and be prosecuted. Such actions may result in denial of access to BLM-managed caves, commensurate with the nature of the violation(s). Continued occurrences in BLM permitted caves will cause the area in question to be put off limits to everyone.

A. No cave material (minerals, speleothems, bones, etc.) may be removed from the cave without a valid existing scientific collecting permit. Collecting for someone else who has a valid collecting permit requires written authorization from the permit holder and from the Cave Specialist.

B. No digging, hammering, or breaking of formations, rocks, etc. may be performed without permission.

C. Aqua Socks or other clean, non-marking shoes must be worn when crossing flowstone areas. Wearing boots or walking barefoot across these areas is not allowed.

D. There will be no wading or swimming in pools to reach cave passages or leads without the consent of the BLM authored officer or his representative(s). Any pools in newly discovered areas must remain pristine and untouched and thus available for scientific research. During or upon conclusion of pool research, the investigating scientist may consult with the BLM authorized officer as to use or avoidance of such pool.

1.13 In-cave Camping During Extended Exploration Work

While camping is not authorized in NCA caves during recreational visits, camping may be authorized during scientific exploration. Team leaders have the responsibility to stop and rest or sleep themselves and crew during project periods if they observe their crews becoming worn out and fatigued. Fatigue is always covered in a daily safety and progress briefings, which includes their respective surface support leads and the BLM Cave Specialist or Cave Program manager.

In project caves like Jewel Cave, South Dakota, and Lechuguilla Cave, New Mexico, and in far Snowy River South it is virtually impossible to have a rescue scenario that will work in the remote parts. Getting a SKED litter with patient through tight passage is not possible. Team success is entirely dependent on physical condition. This includes screening for diabetes, illness, and heart problems - whatever weaknesses that might cause a caver to have difficulty.

It has been found that strong 4-person teams are well-suited for far Snowy River survey trips. Again, this is a safety consideration. While Fort Stanton Cave doesn't have the vertical workout that Lechuguilla or Jewel Cave camping trips have, physical preparation and fitness are paramount to ensure safety and success in such a long passage. A strict selection process will be developed to ensure that the cave and cavers are protected from incidents due to fatigue or not being prepared.

1.14 Technical In-cave Climbing

A. There is climbing potential in the permitted caves. At this time there have been a number of authorized and coordinated technical climbs in the Snowy River Passage to check high leads. These were carefully and safely conducted. Future climbs must always follow the same approach and be coordinated with the Cave Specialist or Cave Program manager before proceeding.

B. The use of bolts, while not strictly prohibited, must be approved in advance by the Cave Specialist or Cave Program manager and shall be used sparingly. Any bolt that is not being used after an initial climb must be removed and the hole covered. Any bolt or hanger that is to be left in place must be made from austenitic stainless steel. If you have any doubts as to the metallic composition of the bolts, do not use them.

1.15 Resource Protection Zones

Due to their sensitive, fragile nature, on-going scientific research, or extreme hazard, such as Priority 7 Passage, are off limits to all persons without permission of the BLM authorizing officer or his representatives. The areas of ongoing scientific research will be well marked physically and on GIS maps. Unauthorized persons are cautioned not to go beyond certain points. Please do not visit or disturb these areas. Persons entering these areas without permission could be denied future access to all off trail areas:

1. Lincoln Cavern.
2. Bat Cave.
3. Priority 7
4. Starry Nights Passage
5. Snowy River Passage
6. Future discoveries that are determined sensitive and designated as a Resource Protection Zone

1.16 Cave Search and Rescue and Pre-planning (see Appendix 8)

Upon authorization of the NCA Plan, a comprehensive cave search and rescue pre-plan will be written and applied to all NCA caves and surface search. The pre-plan will be kept by various key persons in the BLM – Pecos District, Roswell and Carlsbad field offices, at the NCA; caving and scientific partners; regional search and rescue entities and state police SAR area commanders. There will be at least one annual cave and one annual surface search and rescue field training exercise. Every two years, New Mexico representatives for the National Cave Rescue Commission (NCRC) will be requested to conduct an Orientation to Cave Rescue training course on the NCA. The NCRC and the New Mexico Search and Rescue Council (NMSARC) on their own initiative may also coordinate for training exercises on the NCA.

1.17 Unexplored Areas and Survey, Inventory & Mapping

Exploration in BLM permitted caves may not occur without surveying what you see. You are required, without fail, to survey as you go. Exploration without surveying (scooping) is strictly prohibited. Violators will be denied future access to the cave. Standards listed herein must be adhered to when inventorying and mapping. Discovery teams may name new areas, but names deemed inappropriate or distasteful not be accepted.

When moving into unexplored areas, trails shall be established that do not damage cave resources. Persons in lead tape role, shall carefully evaluate the passage and choose the path that will do the least damage to the cave. Trails shall be flagged immediately, so that those persons who follow will not have a choice as to where to walk.

Entering extremely sensitive areas, such as aragonite bushes blocking the path, or other noteworthy speleothems deterring progress, stop and do not proceed. Notify the Cave Program manager. The authorizing officer or his representatives will make a decision of this magnitude.

1.18 New Discovery Classification (see Appendix 7)

Upon new passage discovery, the subject area will automatically be designated Classification 5-E-IV:

Management Class 5 caves or cave sections are closed to general use because they contain paleontological, geological, biological, archeological or other resources of special scientific value that will be easily altered, even by careful use of the cave. This does not exclude administrative entry for management purposes such as monitoring research activities, monitoring for adverse impacts, or the re-rigging of ropes for the safety of those who work in the cave. The extent of the cave makes it important that careful exploration when accompanied by survey and inventory be allowed to continue as part of this classification.

Resource Class E caves or cave sections contain resources of scientific value that can and/or will be seriously disturbed by frequent visits, or by visits of cavers unfamiliar with unique in-cave resources. Scientific resources may be archeological, biological, geological, mineralogical, or paleontological in nature.

Hazard Class IV caves or cave sections extremely hazardous from a structural standpoint. Experience indicates that exploration should be conducted by no less than three cavers, all of whom must have considerable caving experience that includes vertical descent and climbing. All members must observe caving safety and vertical safety rules and must use the following basic equipment:

a. Aqua-type shoes or boots with non-marking soles.
b. UIAA-approved caving/climbing helmet.
c. Electric headlamp mounted on helmet.
d. At least two backup light sources.
e. Water and food for a 24-hour period.
f. First aid kit.
g. When needed, appropriate descending and ascending gear.
h. Cave pack or other durable pack.
i. Specialized clothing as determined.

Failure to comply with these conditions could affect an individual's or team's future access to permitted BLM Roswell Field Office Caves. Some cavers are worried that this classification requires them to carry unmanageable weight, such as automatically carrying vertical gear and ropes. The above classification tells what they must be ready for but doesn't necessarily require all kinds of extra gear. Any proposed and planned trips will be carefully considered by the cave specialist in consultation with the team(s) that will make the trips, because on those long trips every little ounce does indeed count. If high leads are discovered on a trip to survey horizontal passage, then a subsequent trip can be planned where vertical gear and rope is taken in and it may even require some "sherpa" work, but only by cavers who are experienced up to the drop-off point or cache location.

2.0 Administration, Monitoring and Resource Protection

2.1 Permits (see page 23 below – "2. Example of Current Permit")

Except for maintenance or administrative purposes, no permitted cave pristine or off-limits passage or room may be entered without an approved cave permit. Everyone on a trip must sign the permit which also serves as a liability release form. Prior to a proposed trip, a written application must be submitted for review by the cave manager or his/her assistant.

The Cave Program manager, Resource Staff, has the authority to approve permits for Class 2, 3 or 4 caves. Permits for Class 5 and 6 caves must be approved by the BLM authorizing officer or his/her designate. A signature of approval on the application form constitutes a valid permit under the conditions of the form. Solo expeditions will not be permitted.

Permits must be returned to BLM issuing office within 5 days following trip completion. This will help insure that trips are completed safely and that accurate records of cave use are kept. These records will be maintained by the Cave Program manager. On Class 3 trips, groups inexperienced in caving techniques shall be accompanied by at least two experienced leaders to assist the group, to help with emergencies and, to assure that no one remains under-ground unescorted in the event that one leader has to accompany someone back to the entrance.

Anyone who demonstrates incompetence, negligence or other actions detrimental to their own group's safety, or to the cave resources, or fails to cooperate, will be disciplined accordingly. All incidents will be documented and the BLM will be notified as soon as possible. Evidence of incompetence, past negligence, or vandalism will be cause to deny a permit request. Failure of all trip members to read, understand and sign the permit before entry into the cave invalidates the permit.

The BLM reserves the right to include a staff member on any trip and empowers that staff member with the right to abort any trip that endangers cave resources or personnel safety.

2.2 Visitor Use Monitoring and Resource Protection Programs

1. Visitor Use Monitoring

Due to the nonrenewable nature of most cave resources, it is important that the impact of various types and intensities of use be carefully and systematically documented. This is done so that acceptable levels of use can be estimated and a reasonable carrying capacity can be

established for each cave before irreparable damage is done. Due to individual variation, each cave must be monitored and its management evaluated separately.

Carrying capacity is established from the correlation of two important types of information: cave use and the measured condition of the resource associated with various levels of use. The resource used to evaluate impact must be accurately measurable with a consistent technique, and its condition must be correlated with the presence of people in the cave.

2. Monitoring Techniques

Photo and Video Monitoring.

Photo monitor points will be established during initial survey. Quantitative and qualitative measurement of cave resources is generally more difficult than measuring visitation. Within the permitted caves, the monitoring of cave visits and, when possible, water quality is principal indices of cave use impacts. Cave micro-climate may also be monitored.

Vistas are measured using a system of fixed photo points and video points established at selected sites within the cave. Each site is marked with an unobtrusive identification tag. These photos and videos provide comparative qualitative and quantitative data for any resources visible within the photograph.

Pool Monitoring

Although very shallow and limited in amount, future discoveries may result in larger pools. Aquatic systems are vulnerable to alteration by people and include indices of change that are relatively easy to measure. Ions, turbidity, and other parameters that are likely to be altered by human activity will be monitored periodically, where feasible, to quantitatively measure any change within the cave.

Formation Breakage Monitoring

Speleothems found throughout the permitted caves are very vulnerable to damage; damage still occurs due to visitor and natural causes. Monitoring of broken formations will be done to pinpoint areas for photomonitoring. While cavers are very conscientious about avoiding impacts, if a trip into any part of an NCA cave with formations accidentally breaks a formation or formations, they should be up-front about it in the trip post-use report. Thus, we could work together and return to the site and repair the broken formation(s), using restoration techniques and a special non-outgassing epoxy developed specifically for that purpose. Ideally it should be a restoration objective to try to fix all speleothems that seem to have been broken by human activity, such as a number in the Trophy Room of Lower Breakdown Passage or Helectite Hall in the Back Section. Those that seem to be natural breakage should be considered for no treatment and left in-situ.

Biological Monitoring

Cave ecosystems are fragile and subject to detrimental effects by human disturbances. A base line for each cave shall be developed and periodically monitored. This includes bat species and populations.

Gates

Gates are an obtrusion on the aesthetic integrity of the cave entrance and other sections. They often alter the ecology of a natural cave, hindering or entirely impeding airflow, nutrients, detritus, and the movement of bats and other organisms in and out of the cave. The entrances too many caves are so large that gates will not be feasible. Interior gates may be used to restrict access to areas of significant hazards (e.g. Class V) or which merit special resource protection. Gating is used to protect cave resources only where the need is considered essential by the Cave Program manager or authorizing officer and a biologically neutral (bat and other animal friendly) gate can be constructed. National Environmental Protection Act (NEPA) documentation will be required for all gate construction. Any EA requirements can be tiered off the Main Gate and Hell Hole Gate EA's.

If additional gates need to be constructed, the state-of-the-art design of the existing Fort Stanton Cave gates shall be followed (see EA's on file in Roswell Cave Program):

a. Bat-friendly vandal-resistant horizontal spacing/riser design
b. Substantial depth and width concrete footing
c. Schedule 80 round pipes with suspended interior free-rolling stainless steel bars
d. Exterior hardening rods
e. Exterior military or aircraft-grade black epoxy paint
f. Heavy piano-style hinge
g. ½-inch steel plate lock boxes
h. Anodes attached (to prevent corrosion up to 30 years)

Volunteers are going to help build and install gates - coordinate with the caving community representatives.

3. Cave Alteration Situations and Conditions

A. During cave exploration an area may require enlarging to permit entry into new passageways or chambers.

B. Permission to enlarge a constriction, or to dig through breakdown or cave fill, must be obtained in writing from the Cave Program manager.

C. Environmental alterations and potential damage to cave resources will be given the highest priority considerations before permission to alter a cave is given.

D. NEPA documentation will be required before any changes may be made to the natural conditions.

E. Explosive charges or mechanical devices, such as "rock splitters" or "jack-hammers," will not be authorized for use in permitted caves except for pre-approved, coordinated uses.

4. Maintenance Standards

The BLM Roswell Field Office is ultimately is responsible for the upkeep of all BLM facilities, including those underground. All cave gates have been approved by the BLM Roswell Operations Chief for engineering integrity prior to construction and installation. This requirement will continue.

The Operations Chief and the Cave Program manager will be responsible for assuring that maintenance techniques do not degrade the permitted caves beyond trails or other cave developments. During maintenance projects in the cave, tools and materials shall not be left in the cave for extended periods and when not in actual use shall be concealed from public view. Exotic substances that will wash or roll off developed areas and enter natural cave areas shall not be used. All materials, including the waste water, shall be removed from the cave.

The use of internal combustion engines in the cavern environment will not be permitted except during daytime local low-pressure airflow out of the cave at the Main Gate. Interior use will be detrimental to cave atmospheres and biota. Additionally, exhaust fumes may have an adverse effect on speleothems and be a hazard to employee health.

5. Cave Restoration Programs (see Appendix 6)

Any visitation in caves causes some direct degradation of cave resources: Foreign matter resulting from human use, such as lint, algae, fungi and bacteria will be problems. To help maintain a natural cave environment, most these materials will be periodically removed, although the natural flooding process in the Main Passage causes that area to remain highly resilient. Trips into off-trail areas often result in mud buildup on flowstone and formation areas. These areas will be monitored and cleaned periodically. Care must be taken in establishing trails through any cave. Speleothem breakage is very difficult to restore.

Cave restoration work will be scheduled and supervised by the Cave Program manager. This type of activity shall not be undertaken by untrained persons; knowledge of caves is of the utmost importance. Restoration projects requiring specialized knowledge or skills not available in BLM staff will be performed by experienced persons on a volunteer or contract basis.

Chemicals detrimental to the caves ecosystem and/or to cave users will not be used in restoration work on a normal, regular, or routine basis. Exceptions must be approved by the Cave Program manager. Direct and indirect effects of all restoration techniques must be carefully monitored to help insure protection of the cave environment. A cave restoration log will be maintained to document both the details of restoration activities and the results of restoration impact monitoring. Individuals or groups involved in cave restoration work will be responsible for the removal of all evidence of their activities (e.g. footprints, tools, etc.) from work areas.

No historic or prehistoric items may be removed from its original setting in the cave without supervision of the BLM archaeologist.

6. Research Guidelines

Ongoing cave research is conducted and encouraged within NCA caves. The majority of this research is contributed by individuals interested in studying caves. Any competent researcher with a proposed project that is consistent with BLM cave management policies and likely to contribute to the management and understanding of cave resources will be encouraged to work. Research proposals must be submitted to the Cave Program manager for review and approval or disapproval.

Based on the proposal and completion of a volunteer agreement, a project plan will be prepared by the Cave Program manager. Project leaders will work under a separate permit for each daily

session. Researchers will provide the Cave Program manager with data from their studies in an appropriate format, such as field notes, photographs, special reports, scientific articles, and /or other materials. Researchers will meet with and present their findings to the Cave Specialist or Cave Program manager and other appropriate staff or researchers.

Progress reports follow this format:

a. Project Name, Date and Participants
b. Project Objectives
c. Work that was actually accomplished (including photos and graphics)
d. Recommendations for Further Work

7. Interagency Collaboration

Bureau of Land Management, Roswell Field Office, will collaborate with its adjacent Carlsbad Field Office; the Carlsbad Caverns and Guadalupe Mountains national parks; and the U.S. Forest Service, Guadalupe and Smokey Bear ranger Districts, Lincoln National Forest) on cave management activities. To achieve this end, a Memorandum of Understanding has been implemented between all three agencies specifically for cave management concerns. Much of the content of this plan was developed jointly with these agencies. Cave Program staff occasionally engages in joint cave surveys with other agencies to reduce costs and enhance efficiency.

8. Roswell Field Office Procedures for all Caves under The Federal Cave Resources Protection Act (FCRPA) Of 1988 (Pl 100-691)

Need

A. Significant caves on Federal lands are an invaluable and irreplaceable part of the Nation's natural heritage; and

B. In some instances, these significant caves are threatened due to improper use, increased recreational demand, urban spread, and lack of specific statutory protection.

Stated Purpose

A. To secure, protect and preserve significant caves on Federal lands for the perpetual use, enjoyment, and benefit of all people; and

B. To foster increased cooperation and exchange of information between governmental authorities and those who utilize caves located on Federal lands for scientific, education, or recreational purposes.

Cave Definition

The Federal Cave Resources Protection Act (FCRPA) of 1988 (the Interior Department regulations [43 CFR Part 37] implementing the FCRPA) defines a cave as:

Any natural occurring void, cavity, recess, or system of interconnected passages which occurs beneath the surface of the earth or within a cliff or ledge (including any cave resource therein,

but not including any vug, mine, tunnel, aqueduct, or other manmade excavation) and which is large enough to permit an individual to enter, whether or not the entrance is naturally formed or manmade. Such term shall include any natural pit, sinkhole, or other feature which is an extension of the entrance.

Karst Features

While not covered in the FCRPA, features in the karst such as subsidence areas or features that seem to be a cave, but do not quite fit the cave definition given above can be termed karst features:

> The dissolution of soluble rocks (limestone, dolomite, marble) has a great impact on the land surface, where it produces a variety of distinct features, such as fissures, rock pinnacles, closed depressions (subsidence features, sinkholes, etc) and sinking streams. A landscape that contains these features is called karst. (Commission on Karst Hydrogeology and Speleogenesis, 2011; Palmer, 2007; Palmer & Palmer 2009)

Cave Name

When a cave has an established name, this will be retained unless deemed inappropriate. The changing of a cave name is a serious matter and must be well documented, tentatively approved by the BLM authorizing official, and final approval must come from the Council on Geographic Place Names. In the case of a cave without an established name, a number will be assigned. Discoverers can name a new cave section, but it cannot be named after a living person nor be inappropriate or distasteful. Also, it may not be named after a geographic feature which may give away its location. All new names are subject to Cave Specialist approval.

Cave Records and Files

A file for each cave or sensitive section, such as Lincoln Cavern, is be maintained separately and kept in a locked, secure location with limited access. Each cave file must contain the following at a minimum:

- Discovery Date
- Finders
- Assigned number
- How located
- How and why named
- Topographical map of area showing the location of the cave
- Directions for reaching the cave entrance
- Road log by tenths of a mile
- Walking distance, both vertical and horizontal
- Approximate walking time at an average pace
- Pedometer log or step log
- GPS coordinates in UTM
- Detailed descriptions of hazards present within the cave, and/or enroute to the cave entrance, including recommended equipment and procedures for reaching, entering, and exploring the cave. Rope lengths for each situation shall be specified.
- Detailed descriptions of major features of the cave, including speleothems, fauna, flora, biological, hydrological, geological, archeological, paleontological, etc.

- Recommendations on type and amount of use restrictions.
- Cave Map, including plan view, vertical section, and all original survey computation notes, unless an agreement beforehand lets an organization other than the BLM keep the original notes. If this is the case, then a good copy of the notes will suffice.
- Photographs showing the cave's entrance and at least the cave's major areas and features. Notation will include the photographer and the date the photograph was taken.
- Significant trip reports.
- Permanent record, listing date of each cave entry and number of cavers on each trip.

3.0 FORT STANTON-SNOWY RIVER CAVE NCA SURVEY/CARTOGRAPHY STANDARDS

3.1.0 INTRODUCTION TO DATA COLLECTION METHODS AND STANDARDS

All survey and cartographic work will adhere to standards developed by the Fort Stanton Cave Study Project (FSCSP), in cooperation with the Bureau of Land Management (BLM). FSCSP has endeavored to establish and maintain high standards for data collection by using the most accurate survey instruments and equipment appropriate for cave survey, and by emphasizing attention to detail, accuracy, and reproducibility. The standards are coincident with those used by the National Speleological Society.

- Low-impact data collection methods are practiced, coupled with a responsible caving ethic to help preserve the natural state of the cave and safely conduct all survey work.
- Prior to cave entry, there will always be a team safety and project briefing. This includes cave-specific rules and conduct. This is a careful, comprehensive meeting and never hasty.
- The following process and standards are considered the minimum, and be revised as evolving survey standards and technology are developed.

3.2.0 SURVEY ACCURACY STANDARDS

3.2.1 Distance Measurements

- Measured distances are usually read to the nearest tenth of a foot or equivalent.
- Measured data may be recorded to the nearest 0.01 foot, and if electronic distance meters are used, pairs of such numbers may also be recorded for averaging during data reduction.
- Because the accuracy of the survey is a function of the length and number of survey shots, attempts will be made to maintain a balance between the number of shots and the accurate portrayal of the cave.
- For improved sketch accuracy, recommended maximum distance between survey points is 50 feet, except in unusual cases.

3.2.2 Instrument Measurements

- Record to nearest 1 degree, although 0.5 degrees is preferable. Back-sights should agree to within 2 degrees.
- Inclinometer readings should agree to within 2 degrees, and be recorded with either a “+” or “-“.

3.2.3 Sketch Scale

1” = 20 feet (1:240) or 1”= 25 feet (1:300), depending on sketch paper grid.

3.3.0 INSTRUMENTATION/EQUIPMENT

3.1 Instruments for Angle Measurement (Compass & Inclinometer)

3.1.1 Survey team members always record readings as best you can, with a high degree of accuracy in mind. If the instrument reader can comfortably read to the nearest 0.5 degree accuracy, that is perfectly acceptable.

3.1.2 All survey shots other than spray shots or dead-end shots should be recorded with a fore-sight and a back-sight to a precision of one degree using a compass and inclinometer, or digital measuring devices with similar precision.

3.1.3 The fore-sight and back-sight couplet should agree within two degrees, or both shall be re-measured. If agreement cannot be achieved after two measurements each, the shot considered better by the team shall be circled on the data sheet. In these cases, efforts should be made to reposition stations or take other actions that enable higher accuracy.

3.1.4 Suunto compasses and inclinometers are the preferred surveying instruments for underground work. Brunton Pocket Transits and waterproof sighting Silva compasses are used on occasion where they better meet the need of the specific situation such as high angle shots, very low passages or small tripod-mounted instruments. Surface tailored instruments, (e. g. tripod-mounted transits or theodolites), are used underground for surveys through large passages and then only to establish or enhance a necessary main survey line.

3.1.5 As of this writing, electronic compasses such as the *Disto-X* total station instrument are becoming more common and are occasionally used. Their use will be fully embraced once their calibration, repeatability and reliability are more certain. Non-volatile memory is strongly suggested for any computer-based instruments and note taking.

3.1.6 Automated laser theodolites (LIDAR) have been used occasionally underground, and we anticipate greater use as equipment becomes smaller, more robust and more affordable.

3.1.7 Compass Calibration

- The Fort Stanton Cave Study Project (FSCSP) and BLM recognize the importance of instrument accuracy and standards. A compass test course has been established and maintained at the BLM Bunkhouse. Before use in FSC and other NCA caves, personnel are expected to calibrate all compasses and inclinometers using the compass test course.
- In the future, as BLM occupies its headquarters building, a permanent calibration station will be established either near the headquarters or near Fort Stanton Cave. Entities, such as FSCSP, Southwest Region-NSS and Cave Research Foundation will be informed of this location and instructions for use.
- Calibration checks the functioning of the instruments and the capability of the crew, and provides current calibration data for declination error and eccentricity.

- Declination and calibration information is recorded in the calibration course worksheet and utilized in data reduction to remove another variable to accuracy of the surveys.
- Instrument serial numbers must be recorded so that calibration parameters on file can be referenced.
- Declination on Brunton compasses (or other instruments capable of this setting) must be set to “0” (declination changes with time and must be determined for each survey date when entered into the computer program).

3.1.8 Back-sights

- To assure quality control in data collection, back-sights of both compass and inclinometer readings are taken in all but the most difficult situations. Fore- and back-sights should agree within the capability of the instrument and instrument reader.
- A working rule is that the front and back sights should agree within 2 degrees.
- It is noted that azimuths for high-angle shots are more difficult to read accurately than horizontal ones, and some reading positions more difficult than others, and greater variability is allowed in such cases.
- Every will attempt be made to minimize the number of high-angle shots though they be unavoidable in some instances.

3.2 Distance Measurement

3.2.1 All distance measurements shall be taken to within one-tenth (0.1) foot precision or equivalent with a tape that is properly tensioned, or an electronic measuring device with a similar precision.

3.2.2 The majority of surveys are conducted with survey-grade fiberglass tapes. Tapes graduated in feet and tenths are preferred over those in feet and inches or metric units. Quality fiberglass tapes offer the same accuracy as steel when properly used and maintained. Sketchers often reference the distance along the survey line on the floor to locate cave features.

3.2.3 Laser distance measuring devices have become more common and have been used in Fort Stanton Cave for both survey line and wall measurements; they can increase survey speed and reduce impact from dragging tape, but at least two readings should be taken for primary survey line shots to confirm that the target has been recorded correctly.

3.4.0 NOTES/SKETCHES

3.4.1 Survey information is to be recorded in books, with an appropriate pencil. The survey book pages are of a specific type developed for NCA caves. Names of all personnel, date, cave and location within the cave, and all instrument identification data should be recorded.

3.4.2 The books, often plastic binders with water resistant survey paper, should contain removable standard-sized surveyor's pages.

3.4.3 On occasion, 8.5 x 11 inch paper is used with a clipboard when the size of the passage demands a larger drawing surface. It is suggested that changes in data (error correction) should be crossed out rather than erased.

3.4.4 Always indicate on the sketch, the cross-section, profile scales, and a North arrow.

3.4.5 Indicate station locations with a small triangle around a dot for the station. In-cave sketches of passage detail should be made at not less than 1" = 20' or a scale of 1:240.

3.4.6 The graphical depiction of the cave floor, walls, and ceiling is very important and should utilize FSCSP, National Speleological Society, Cave Research Foundation or equivalent graphics.

3.4.7 The sketch should show the gross morphology of the passage and details down to the resolution of at least a 4-foot by 4-foot square.

3.4.8 Non-standard symbols, if used, should be defined in the book.

3.4.9 Collect cross-sections liberally if there are distinct changes in passage cross-section or morphology.

- The minimum number of cross-sections is one at each survey station
- A running or extended profile of the passage(s) being surveyed should be sketched to show gross morphologic changes in the ceiling and floor along the survey line or center of the passage.

3.4.10 Side passages should be noted.

- If not surveyed, sketchers should give the passage size and remark on the passage appearance.
- If any air currents have been detected in an unexplored side passage by anyone in the survey party, it should be so noted on the sketch notes.

3.4.11 Note Taking and Sketch Process

- The survey line is sketched to scale using a protractor and ruler so that computer scans of the sketch page may be used when drafting a computer-based map.
- A descriptive sketch of the cave passage and its features are drawn to scale with the plotted survey line.
- Cross-sections, which illustrate passage morphology, are drawn at regular intervals (i.e. every station) or as necessary (due to complex features) on the sketch.
- A vertical profile showing the vertical components of the floor and ceiling should be included.
- Passage features and attributes are depicted symbolically using a standard set of descriptive cave map symbols on the NCA form, that be printed on the back cover of the survey book. Refer to the back cover extract AT 6.0 below.

3.4.11.1 Stations

- Offsets from the actual station locations will not be used to obtain distance, inclination, or compass readings unless there is no practical alternative.
- In that case, offsets must be in the same direction, elevation, and distance from both stations in a shot, plus a description of the offset technique used for every sight measured this way must be in the survey notes.

3.4.11.2 Station Labeling

- Station locations that are placed on natural cave surfaces should be marked with either a tiny scratch or unobtrusive pencil or marking pen dot.
- Survey stations are usually marked with blue non-degradable plastic flagging tape hung from ceiling cracks or otherwise firmly attached, so that stations be recoverable in the future.
- Blue flagging is preferred by current convention.
- Labels should be written with waterproof marker pen.
- “Floating” stations on the tape itself (marked by circled dot near the tape end) are preferable when this permit easier and more accurate sightings than stations set directly on cave surfaces.
- Alternative station-marking methods may be used where special circumstances dictate.
- As a number of surveys have used a person's pack as a station on the Snowy River surface, every station should be marked if at all possible, but temporary stations may be used in difficult situations (e.g., delicate areas).

3.5.0 PERSONNEL AND DATA COLLECTION PROCEDURES

3.5.1 Survey teams are given assignments by the expedition leaders including suggestions on where to tie a new survey, existing survey station numbers, and usually a suggested designation for the new survey.

- Scooping (exploring new passages without concurrent survey and inventory of those passages) is not allowed. This is BLM-Roswell Field Office policy for all caves in its jurisdiction.
- Listings of survey designations already in use can be produced using the Compass software. This should be given to the team leader(s) to allow them to choose appropriate new designations (either a continuation or new side survey).
- The cartographer should have this information to hand off to team leader on every trip, but what happens in the cave during new surveys cannot always be anticipated in advance, so the team leaders need to use their best judgment.

3.5.2 Running a survey line without sketching is not allowed for new passage surveys, but obviously resurveys to correct or check angles, or control (e.g., theodolite baselines) surveys will be permissible.

3.5.3 If existing survey points cannot be efficiently found in the cave, a sketch of the past surveyed passage should allow a proper tie point to be established under the direction of the team leader.

3.5.4 Hanging (unconnected) surveys are not allowed, and if teams are split due to the nature of a passage it is the duty of both team and sub-team leader to ensure that there are no hanging surveys.

3.5.5 A survey team usually consists of three to five members with duties as described below. Some individuals may have multiple duties, and some may trade off duties during the trip.

3.5.6 Depending on the size of the passage, the skills of the team, and the number on the team available for surveying, inventory, photo documentation, etc. these tasks may be adjusted to optimize team performance.

3.5.7 Factors that determine team size are available personnel, their abilities, experience level, passage characteristics, need for training, resource sensitivity, safety, and complexity of objectives.

3.5.6.1 Team Leader

- Manages personnel, and oversees safety, route finding, resource protection concerns for the trip, and is responsible to make sure the trip report is written and provided to the expedition leader.
- Carries lock combinations and/or keys for the team when they are required.
- Makes sure all the team has adequate supplies and equipment, including survey equipment.
- Designates duties to other members of the team.

3.5.6.2 Sketcher

- Sketchers are not formally approved, such as at Carlsbad Caverns, but it is required that new people provide examples of their work to a given project lead in advance of sketch work in the cave, unless there is a high recommendation about abilities from a veteran Snowy River survey member.
- During active survey the sketcher (who may also be the designated team leader) manages the survey team and keeps the survey notes and sketch book.
- Measured distance, instrument readings and passage dimensions are recorded on the pre-printed survey paper by the sketcher, who also verifies that back-sights are within tolerance, sketches the passage to scale, and draws appropriate cross-sections and profiles as needed.
- Sketchers should always repeat the measurements aloud after entering the data from others to verify their action.
- May on occasion designate others to sketch the passage cross-sections and/or profiles.
- Review the process for the notes to provide feedback to sketchers - notes are reviewed during the trip and later post-trip. Any problems result in a debriefing or correspondence with the cartographer.

3.5.6.3 Lead Tape Person

- Selects an appropriate new station in line-of-sight with rear station and marks it.
- Holds the tape or verifies the location of the laser spot.
- Usually reports the Left wall, Right wall, Up and Down distance (LRUD) at the station to the sketcher.

3.5.6.4 Rear Tape Person

- Reads the tape or laser rangefinder and reports the data to the sketcher.
- On occasion the lead and rear tape persons may reverse their “smart-end-of-the-tape” duties.

- May be required to also report the Left wall, Right wall, Up and Down distance (LRUD) at the instrument station to the sketcher.

3.5.6.5 Rear Instrument Person

- Reads a fore-sight for compass and inclinometer with the lead tape person holding a light on the station

3.5.6.6 Lead Instrument Person

- Reads a back-sight on the rear station with the rear tape person holding a light on the station.
- Alternatively the rear instrument person moves forward to the next station and sights on the light on the station.

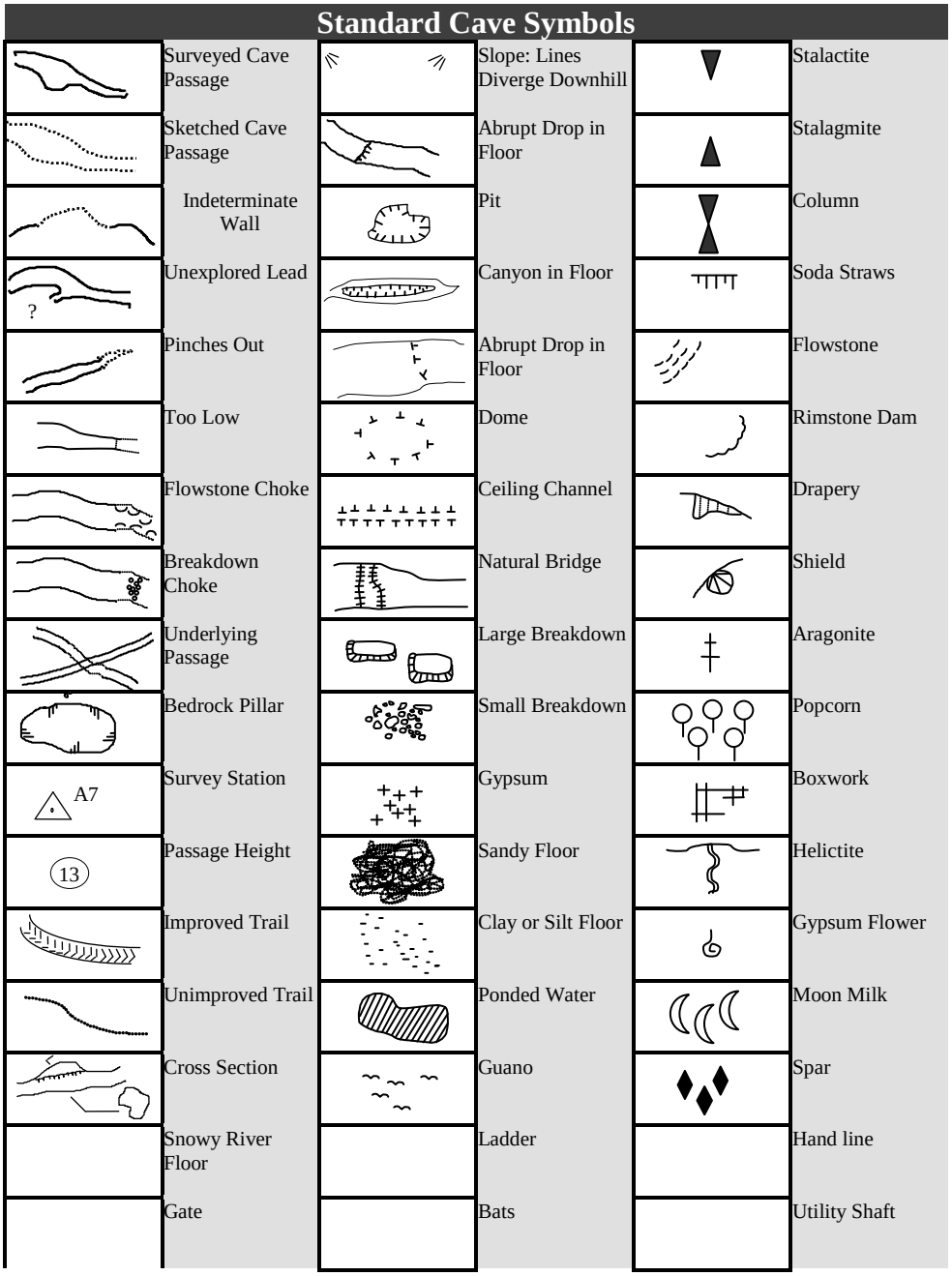
3.5.6.7 Inventory Person

- Keeps specific cave passage characteristics data in a separate notebook.
- May also enhance their observations with photos.
- May also assist with sketching cross-sections and passage profiles.

3.5.6.8 Cave Radio Person

- In charge of setting up and running the cave radio, if so equipped.

3.6.0 SURVEY BOOK BACK COVER



4.0 Roswell Field Office Cave Permit Documents

The recreation cave permit and the administrative cave permit use the same form, shown below.

4.1 Cave Permit Application

United States Department of the Interior, Bureau of Land Management
Roswell Field Office, 2902 West 2nd, Roswell, NM 88201-2019
Phone: 575-627-0272

<<< APPLICATION FOR CAVE ENTRANCE PERMIT(S) >>>
THIS FORM IS NOT A PERMIT

Complete this Application and Return to the above Address Allow *One Week* for Processing. A Separate Permit Be Sent to You.

Cave Name(s) and Interior Destination(s)	Intended Use Date	Alternate Dates	
		2nd Choice	3rd Choice
FORT STANTON CAVE			

PERSON TO BE CONTACTED IN CASE OF AN EMERGENCY (Name, Address, Zip, Area Code, Day & Night Phone Number(s), Email):

PERSON TO BE CONTACTED IN CASE OF AN EMERGENCY (Name, Address, Zip, Area Code, Day & Night Phone Number(s), Email):

TRIP LEADER (Must be 18 years or older):
1. Name, Address, Zip, Area Code, Day & Night Phone Number(s), Email, Fax Number (if available):

Names, Addresses, Phones and Emails of other people who enter the caves(s). The consent of a parent or legal guardian is for all individuals under 18 years of age who not be accompanied on the proposed cave trip by their parent or legal guardian:

2.

3.

4. Continues to #10

THIS APPLICATION FORM IS NOT A PERMIT

PURPOSE OF VISIT: ☐ Recreation ☐ Photography ☐ Education ☐ Research ☐ Survey ☐ Mapping ☐ Administrative

☐ Other: Describe

PARENTAL OR LEGAL GUARDIAN CONSENT
As part of the application to enter the cave(s) administered by the Bureau of Land Management, **I consent** to allow my child to participate in the proposed cave trip. The trip leader named on this application form is delegated the responsibility for the care and instruction of my child while he or she is in the cave(s). By my signature on this form, I also agree on behalf of my child to be bound by the permit General Conditions and any Special Stipulations that apply to authorization for the cave visit.

CHILD'S NAME AND AGE (Print)	SIGNATURE OF PARENT OR LEGAL GUARDIAN
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
Continuation:	

THIS APPLICATION FORM IS NOT A PERMIT

4.2 Example of Current Permit

In Time:	**Est. Out Time:**	***SRP ADMINISTRATIVE – CAVES***
U. S. Dept of the Interior, Bureau of Land Management, Roswell Field Office, 2909 West 2nd, Roswell, NM 88201-2019 (575-627-0222)		
Fort Stanton Cave – Data Loggers	**Permit # NM510-111001#1**	**Trip Date: 10/01/11**
Permission is hereby granted to John Xxxx and 5 other people to enter the above named cave(s), located on public lands as reflected by signatures below. Authorized by**:** *Xxxx Xxxx, Cave Specialist* Date **9/30/2011**		
WARNING: There is an inherent danger in entering caves. If you were injured, rescue may be delayed due to very small crawl areas and or long passages. If you enter, you do so at your own risk, realizing the danger of injury or death (See stipulation number 2 below).		
PLACE THIS PAGE ON VEHICLE DASH, THIS SIDE UP		
Take Stipulations & Combination Pages with You		
ON EXIT, DROP PERMIT IN GREY METAL BOX AT SHELTER - SOUTH END OF FENCE		
This authorization is validated only upon signature of the Permittees, and is valid only for those individuals whose signatures appear hereon. The following signatures indicate that permittees have received and understand information provided by the BLM on risks which may be found in the cave(s), and agree to comply with the general conditions and attached *RISK & SPECIAL STIPULATIONS SHEET – FORT STANTON CAVE* for this authorization. *TRIP MEMBER SIGNATURES* **-** By signing below, I acknowledge that I have read, understand and agree to follow all permit procedures and stipulations:		
1. Trip Leader, Print→	**Sign→**	
2. Print	Sign	
3. Print	Sign	
4. Print	Sign	
5. Print	Sign	
6. Print	Sign	
7. Print	Sign	
8. Print	Sign	
9. Print	Sign	
10. Print	Sign	

EMERGENCY (cave rescue, serious injury, death): In this order - call
NM State Police SAR Resource Officer **cell#, email**
or NM State Police SAR Area Commander/Field Coordinator **cell#, email**,
or NM State Police Field Coordinator **cell#, email**
& BLM Cave Manager **cell#, email,**
& BLM Roswell Field Manager **cell#, email**
& **BLM Ranger**, **cell#, email**
& **White Mtn. Search & Rescue, cell#, email**

If none of the above can be reached - BLM 24-HOUR Interagency Dispatch 1-877-695-1663 (tell the dispatcher to send State Police).

ILLEGAL ENTRY OR VANDALISM IN PROGRESS call Sheriff 575-648-2341 & BLM Ranger cell#, email

LOCK/COMBINATION PROBLEMS, Cave Manager **cell#, email**. Other numbers to try: Outdoor Recreation Planner **cell#, email**, Cave Program Volunteers **cell#, emails** (Fort Stanton, Torgac's, Crockett's caves), **cell#, email** (Fort Stanton Cave), **cell#, and email** (Fort Stanton, Torgac's, Crockett's caves) . If no contact, try the BLM Valley of Fires Recreation Area at **575-648-2241**.

RISK AND SPECIAL STIPULATION SHEET - FORT STANTON CAVE

Driving Directions To Cave: On U.S. Highway 380, if approaching from Capitan, turn right at cattle guard .2 mile east of Mile Marker 91. If approaching from Lincoln, turn left at cattle guard .8 mile west of Mile Marker 92. Drive 1.1 miles to intersection. Turn left into Cave Canyon.

Driving Directions To BLM Host Site: On U.S. Highway 380, turn south on State Road 220 and go to mile marker 15. Enclosed area is the BLM Host Jerry Bathurst.

COMBINATIONS (Only for you and your caving group - do not share these with anyone else)	Fence	Main	Roaring	Hell	Agave	P 7

General Risks: Make your trip a safe and enjoyable one by being prepared and careful. All caves contain some risks which are common to the underground environment such as loose rocks, low ceilings, low or tight passages, slippery surfaces and uneven floors. Be prepared by using proper equipment, following safety hints and using common sense. Specific risks described below are those which are known by BLM, but additional risks from various sources may have occurred since the cave was last inspected.

Specific Risks

Main Cave (excluding Hell Hole)

1. Slippery surfaces.
2. Low ceilings.
3. Loose breakdown.
4. Several tight squeezes.
5. Intermittent stream flow with deep pools (usually seasonal).
6. Hypothermic conditions due to cold water (39-54 degrees) in northern main passage (including summer).
7. Steep slopes.
8. Muddy conditions.

Back Section (including Hell Hole)

1. Extremely long crawls.
2. Low ceilings.
3. Tight squeezes.
4. Loose rocks.
5. Slippery surfaces.
6. Muddy conditions.
7. Rescue be exceedingly difficult

Snowy River

1. Pristine floor that must be preserved at all costs.
2. Magnesium oxide on walls and ceiling – do not touch or it come off and cause an impact on the floor deposit. If that happens, STOP, and do resto until impacted spot is COMPLETELY clean.
3. Low ceilings.
4. Loose breakdown.
5. Several tight squeezes.
6. At least three low crawls each in excess of 1,500 feet. Every single ounce in your pack counts – pack careful and pack well
7. Intermittent stream flow with deep pools (usually seasonal).
8. Hypothermic conditions due to cold water (39-54 degrees) in Conrad's Branch on way to Snowy
9. Steep slopes.
10. Muddy conditions.
11. Rescue be exceedingly difficult

Permit Stipulations (1 of 11)

1. Effective on receipt of this permit – ALL persons entering any BLM-Roswell Field Office-managed public lands caves are required, without fail, to follow the decontamination steps below. This is a Nationwide Effort to Stop the Spread of White Nose Syndrome and its Catastrophic Consequences. BLM cave specialists are very likely to inspect your group and we deny entrance to anyone who has not complied. Fort Stanton BLM Bunkhouse is the Decontamination Station and equipment is provided. For other caves you must bring your own decon materials.

White-Nose Syndrome (WNS) is a deadly ailment that has recently killed more than 1,000,000 bats in the eastern United States. Biologists are working hard to study WNS, but no one yet fully understands the cause of the deaths, how to stop them, or how to stop them from spreading. What is known is that WNS is spreading. The U.S. Fish & Wildlife Service (USFWS) asks that people please follow all cave closure advisories; i.e. recreational caving should not occur in WNS affected and adjacent states. The main goal for this protocol is to put in place reasonable practices that reduce the transfer of infectious agents, which potentially affect bats, from one cave to another cave. We recommend that you follow these practices any time you plan cave activities outside the WNS affected zone. Inside and adjacent to WNS affected zone, the USFWS recommends that no recreational caving activity occur.

1.1 Avoid contact with bats - do not disturb bats at any time.

1.2 Fort Stanton, Crockett's and Targoc's (Torgac's) caves are **major hibernacula.** To protect hibernating bats, they are closed annually to recreational caving from November 1 to April 15.

1.3 You should not handle bats. If you come across live or dead bats with WNS, immediately contact the Roswell Field Office Cave Specialist or Wildlife Biologist at 1-575-627-0272. If you get their voicemails, leave a message of your location, the date, and a way for them to contact you. Call the above number again tell the operator what's going on, and ask that one or the other be paged, or page the Field Manager or Assistant Field Manager for Resources. If contact cannot be made then go to one of these links to contact your state wildlife agency (http://www.fws.gov/offices/statelinks.html), e-mail WhiteNoseBats@fws.gov, or contact your nearest U.S. Fish and Wildlife Service Ecological Services Field Office (http://www.fws.gov/offices/).

1.4 Cave managers across the country are concerned for our resident bat populations at hibernation sites - such as Fort Stanton Cave and other caves in the Roswell region that are bat hibernaculae, and have unified protocols in place. Before and After your cave trip(s) you are required to follow the protocols (protocols are being continually updated, so be sure to revisit the sites and protocols just before your cave trip).

US Fish and Wildlife Service http://www.fws.gov/northeast/wnscavers.html

National Speleological Society http://www.caves.org/WNS/index.htm

Western Bat Working Group http://www.wbwg.org/conservation/whitenosesyndrome/whitenose.html
1.5 If you have any questions on the protocols, please call BLM Roswell Cave Specialist/Cave Program Manager xxxx xxxx at Cell 575-420-7121 or Desk 575-627-0222. Prior to each caving outing, check http://www.fws.gov/northeast/wnscavers.html for updates to these procedures and for cave closures.

Before Caving:

Enter only with clothing, boots, and equipment that have been fully cleaned using the protocol below. Do

not take gear into a cave if that gear cannot be thoroughly decontaminated or disposed of (i.e. if harnesses, ropes or webbing, etc. cannot be decontaminated, we advise that you not enter caves or parts of caves requiring use of this gear).

Cave Entry:

●Anything used at any cave previously must be clean and deconned prior to cave entry. Consider showering or bathing prior to cave entry. All clothing, footwear, safety and work equipment, and other required implements should not be used in multiple entries on the same day unless the cleaning and decontamination procedures can be performed between each entry. Keep the number of items intended to be brought into a cave to a minimum.
●**Before going caving, prepare for cave exit by placing a plastic container near the entrance of the cave inside the cave fence.**
●The plastic container should contain necessary equipment for on-site decontamination. On-site decontamination equipment includes such items as plastic bags, small broom, extra clothing, footwear, and equipment. Enter with clean clothing, footwear, and equipment. Caving coveralls or disposable outerwear, rubber boot covers, and latex rubber gloves could be used for each site entry in lieu of decontamination procedures for clothing. Upon exit, place items in sealable containers, to be appropriately decontaminated or disposed of off-site.

After EVERY Caving Trip, Upon Cave Exit:

●Thoroughly scrape or brush off any dirt and mud from your clothes, boots, and gear and then place them in a sealed plastic bag or plastic container with lid to be cleaned and disinfected off site.
●Outer clothing is removed prior to entering a vehicle after/between a site visit. A clean change of clothing is required. Surface cleaning of exposed skin (arms, face, neck, hands, etc.) with antibacterial Lysol wipes must occur prior to entering vehicle(s).
●To prevent or reduce the risk of people spreading WNS throughout the United States and other parts of the world, follow this process:

●Upon exiting a cave, whether inhabited by bats or not, follow the containment and decontamination procedures below. Decontaminate all clothing, footwear, and gear prior to departing for your next caving trip if you did not decontaminate these items after last exiting a cave.

Cave Exit:

●Care needs to be observed that the fence lock and chain are not contaminated while coming out. If they do get contaminated, they need to be deconned on site with hand sanitizer. Do not go from cave to vehicle and unlock it without decontaminating. As a whole, caving parties need to work out an exit plan so as not to contaminate or re-contaminate various surfaces.
●At sinkhole top – Decon Area, brush dirt and mud from all clothing, equipment, ropes, and any other items carried into the cave. Brushing dirt and mud off of clothing is especially important as organic material (i.e., clay soils) can prevent the chemical products from penetrating equipment, clothing, and boots, etc.
●Wipe exposed hair and portions of the skin (e.g., face, neck, hands, and arms) with Lysol disinfectant wipes. Place used wipes in a sealable plastic bag. Place all contaminated equipment and clothing which are to be decontaminated off-site in a sealable plastic bag and/or plastic container.
●Be continually aware of your hands so as to not touch non-decontaminated equipment, clothing - or touch plastic containment bags in places that were touched by contaminated hands or gloves, especially bag openings. Hands may have to be continually treated with hand sanitizer due to retouching contaminated spots and areas.

●Change into clean clothing and footwear. Place contaminated clothing and footwear into a sealable plastic bag and/or container. A clean change of clothing is required after a cave visit.
●Because of a tendency to go from cave to vehicle to get decon materials and clothing out, do not store decon equipment and change of clothing in vehicles. As above, use a plastic container near the cave entrance to hold decon materials and clothing change. Do not enter vehicles with contaminated clothing or equipment.
●Showering or bathing is required after cave visits, including when conducting multiple-day excursions to multiple sites.

Stipulations 2 through 11

2. Permittees agree that as a condition precedent to the issuance of this permit, they indemnify, defend, and hold harmless the United States and/or its agencies and representatives against and from any and all demands, claims, or liabilities or every nature whatsoever including, but not limited to, damages to property, injuries to or death of persons arising directly or indirectly from or connected in any way with the use and occupancy of the lands and cave(s) described on this authorization (Public Law 96-95, Public Law 100-691, Federal Cave Resources Protection Act of 1988, 43 CFR 2920.7(f)(3), 43 CFR 8364.1, 43 CFR 8360.0-7, 30-15-6 NMSA 1978). Additionally, permittees agree and accept the provisions of 17-4-7, New Mexico State Statutes, regarding landowner liability applicable to actions occurring under the permit.

3. This permit neither authorizes nor implies permission for the intentional or unintentional damage or removal of cave resources, such as: archaeological and historical artifacts, natural materials or features, plant and animal life, or any item of public property. Violations of federal or state laws, general conditions or special stipulations are punishable, upon conviction, by fines up to $10,000.00, or imprisonment not to exceed one year, or both (Public Law 96-95, Public Law 100-691, Federal Cave Resources Protection Act of 1988, 43 CFR 8364.1, 43 CFR 8360.0-7, 30-15-6 NMSA 1978). It is illegal to dig in this cave without a separate Dig Permit from the BLM authorized officer.

4. Each person in the caving party wear either an ANSI-certified construction-grade hard hat or UIAA-approved caving or rock-climbing helmets, with non-elastic chin strap fastened at all times while in the cave. No other helmet types, such as bike, skateboard, football, military, equestrian, are allowed.

5. Each caver have in their possession at least three sources of light, preferably electric.

6. At least one person in the caving party must be 18 years of age or older and be responsible for the actions of younger members of the party.

7. Pack out and properly dispose everything you take in. Pack out all human waste and properly dispose. Please pack out any other trash you find. However, do not remove previously-placed tape, reflective markers, or survey markers.

8. All pets are prohibited from entering cave(s).

9. No plant, animal, cultural or mineral resources shall be collected from this cave for any reason unless specifically authorized in writing.

10. Overnight camping, firearms and open fires (except carbide lamps) are prohibited in the cave.

11. No fires are to be built within the Surface Fence or Entrance Sink.

Permission to be exempted from any of the above stipulations must be obtained in writing from BLM prior to entering the cave. Exemptions are not granted for Stipulation 1.

TRIP REPORT		
1. Project Name & Date:		
2. Trip Leader & Crew Member Names		
3. Trip Objectives		
4. Work That Was Accomplished		
5. Recommendations for Next Session		

APPENDIX 2

PARAMETERS FOR DRILLING PORTAL ACCESS TO THE SNOWY RIVER PASSAGE FORT STANTON–SNOWY RIVER CAVE NATIONAL CONSERVATION AREA

Introduction

Alternatives A and C allow for the construction of a portal, a vertical shaft drilled offset from the Snowy River Passage (see Figure 1). There is a desire to continue exploration and scientific research year-round without disturbing the bat hibernacula in the cave. A portal would also address the human health and safety concerns. Survey trips to the end of Snowy River are currently lasting more than 33 hours. In the event of a rescue in the far reaches of Snowy River, rescue of an injured caver would take approximately 72 hours if not longer and depending on injury type.

Portal Description

The size of the cave portal would be no more than 36 inches in overall diameter. The location will be completely dependent on where it can be located within the cave passage system. This size will allow for movement of people as well as items in and out of the cave passage. The type of items going into the cave portal will only be limited to their size in relation to the size of the portal. It will also be possible to run temporary electrical power and other electronic signals (radio or data) through the cave portal as well.

Parameters

1. Safety

The main concern for a cave portal will be to enable a safer environment for cavers on exploration trips into any cave passage. The cave portal will be located in such a manner that entry into the cave passage will provide better response times for emergency personnel in the event of injury, avoid hibernating bats, and allow for insertion of supplies or equipment. As cave passages are surveyed in the future travel time will increase under normal circumstances. This increase in travel time will affect the caver in terms of fatigue which could lead to injury.

An example of travel times will be into Snowy River Cave from the traditional Fort Stanton Cave entrance. Currently the distance from Fort Stanton Cave to Turtle Junction (the entrance to Snowy River Cave) is approximately 1.25 miles which takes up to 2 hours one-way under normal conditions. If an injury were to occur in the farthest reach of the current surveyed Snowy River South passage, a distance of approximately 19.33 miles as of July 2012, it could take up to 72 hours to safely extract an injured caver possibly longer depending on type of injury.

An example of where a cave portal could be constructed is near the Return to Snowy River passage or Mt. Airy. Cave portals in these two examples will help decrease emergency response time and decrease the likelihood of further injury to the injured caver or to rescuers. It will also allow for better communication capabilities during the rescue mission or during routine cave exploration trips.

2. Cave Health

It will be understood that some impact may occur to the cave as a result of drilling a shaft. Every possible preventive measure to eliminate surface and subsurface materials from entering into the passage will be used.

3. Geologic Structure

The portal will be drilled through a solid limestone formation to ensure stability in the cave passage and to protect the integrity of the cave.

4. Air Flow

The air flow of a cave passage is important to cave health. The surface bunker shown in Figure 1 would contain an air tight door or hatch in order to maintain the natural airflow through the cave. Baseline knowledge of air flow needs to be established before the construction of the cave portal. Monitoring of air flow in the cave passage will occur prior to construction of the cave portal to establish this baseline. After the cave portal is constructed air flow will continue to be monitored to see if any impact is recorded. If any major impact on airflow is determined then it must be restored to the baseline.

5. Water Flow

Baseline knowledge of water flow needs to be established before the construction of the cave portal. Monitoring of water flow in the cave passage will occur simultaneously with monitoring air flow in order to provide this baseline data. After the cave portal is constructed water flow will continue to be monitored to see if any impact is recorded. If any major impact on water flow is determined then it must be restored to the baseline.

6. Cave Passage Location

The cave portal will be located in a manner that will not affect the health of the cave yet provide access to the passage intended. The preferred location for the cave portal within the cave passage will be off to the side of the passage. This will allow for an environmental seal to be constructed leading into the cave.

Figure 1 is an example for location of the cave portal shaft in relation to the cave passage. The cave passage location will also need to avoid cultural sites.

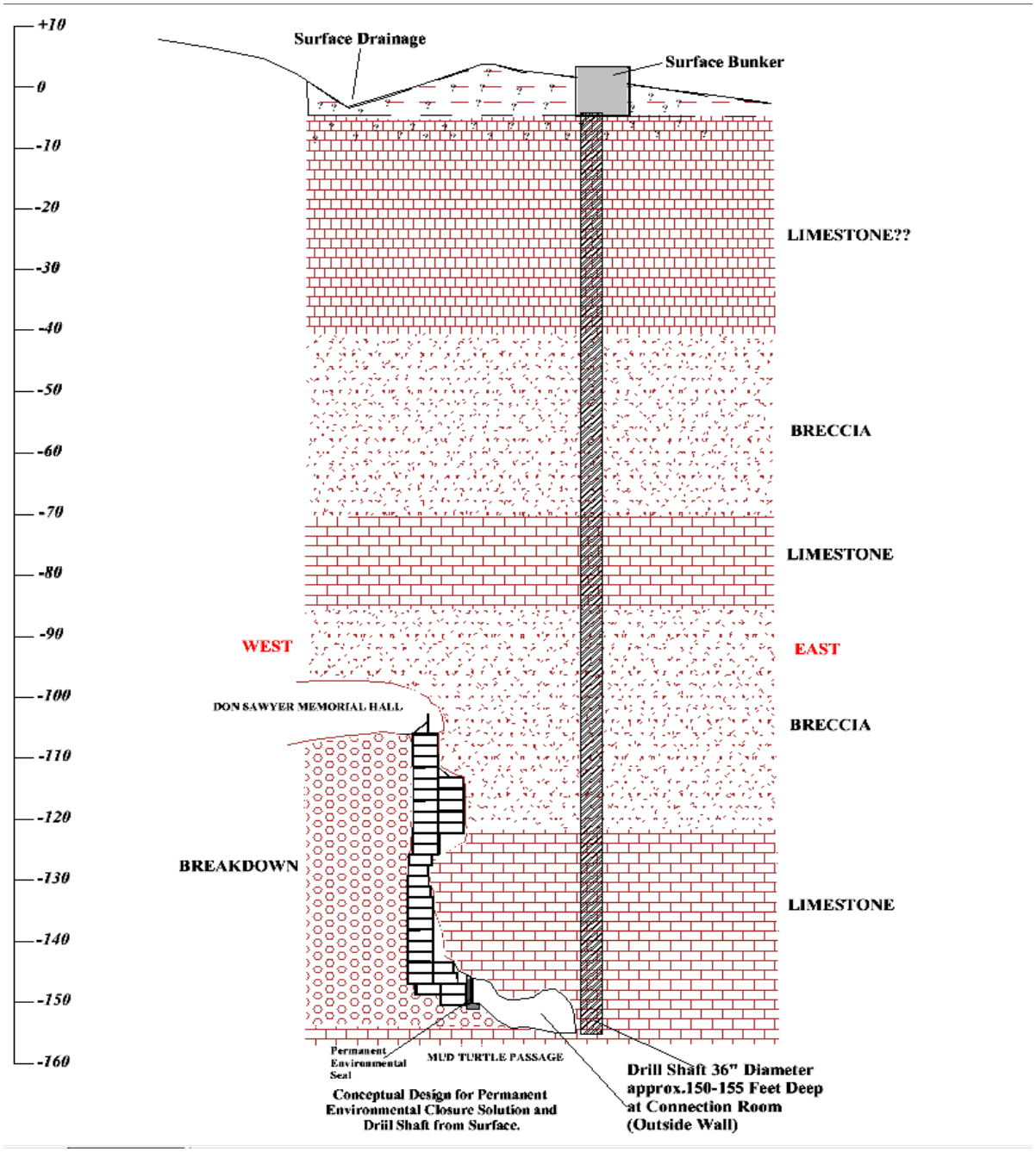


Figure 1. An example of drilling a shaft off-set from the cave passage.

A resistivity study of the proposed cave portal must show that there are not any other cave passages, known or unknown, in the path of the shaft for the cave portal. Accessing multiple passages will be considered if access furthers the scientific research in the cave.

APPENDIX 3
MONITORING, IMPLEMENTATION AND RESTORATION

The appendix describes the methods and processes for implementing decisions in the NCA Plan.

Limits of Acceptable Change within Fort Stanton Cave

As stated in the No Action Alternative, current visitation limits in Fort Stanton Cave are 10 people per permit in the front portion of the Cave and six people per permit beyond the Hell Hole gate. No more than 16 people are to be in the cave at one time. The total number of recreational permits issued per year is not to exceed 400. Total recreational visitation per year is not to exceed 3,200 people. Permits issued to commercial operations will be a percentage of these totals.

The numbers listed above can be calculated using the number of days available for entry into the cave (April 15 through October 31 equals 200 days). Two permits are available every cave day, one for the "front" portion of the cave and one permit for access beyond the Hell Hole gate. This equals 400 permits. Using the maximum number of visitors allowed (16), multiply 16 by the number of cave days (200) and the total number of recreational visitors allowed in Fort Stanton Cave is 3,200.

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.

Survey/scientific trips to the Snowy River passages are conducted under administrative permits. These permits and the number of people included in these permits are not included in the total recreational visitors to the cave. Survey and/or scientific trips carried out under an administrative permit may exceed 16 people per day.

Limits to Visitors to Fort Stanton Cave

Alternatives A, B, and C establish a range of visitors so that at any one time three to 16 people could be in the cave. As in the No Action, occasional survey trips under administrative permits may exceed 16 people. The acceptable range of visitor use will be determined by the following factors:

- Impacts of visitor use
- Public demand for permits
- Lack of impact to the resident bat population
- White-nose syndrome (WNS) in the bat population

Although a change in any one of these factors may result in a change in visitors allowed in Fort Stanton Cave, the presence or threat of white-nose syndrome may cause the cave to be closed to all recreational visitors.

Impacts of visitor use will be monitored with periodic surveys of the cave conditions and will include photographs illustrating impacts to the cave. Other monitoring methods may include, but are not limited to, barometric air pressure studies, air temperature records, and water quality monitoring in the cave.

After the NCA Plan goes into effect, the BLM will continue with permitting the current numbers of visitors to Fort Stanton Cave and use the factors above to determine if any adjustments need to be made.

Prospective Recreational Visits to Snowy River Passage

During the scoping period the issue of allowing recreational visits to Snowy River Passage was raised. Accordingly, this issue is analyzed in Alternative C. The BLM will consider allowing recreational visits to the Snowy River Passage when:

- The extent of the passage is known. Biological, cultural and geological surveys of Snowy River must also be completed.
- Portal access large enough for people to pass through is available to Snowy River or, should portal access not be available, the prospective visitors must demonstrate a physical fitness level equal to the physical demands of the trek through the cave.
- The BLM develops a clothing and equipment protocol necessary to protect the mineral deposits in Snowy River. The purpose of the protocol will be to maintain the whiteness of the calcite formations and to ensure visitors are adequately prepared for their visit.
- The BLM develops visitor limits after learning the extent of Snowy River and the value of the resources within the passage. Any group visiting Snowy River will be led by a BLM-approved guide.
- The BLM cannot predict with any certainty when exploration of Snowy River or when biological and geological surveys will be completed. Currently, BLM allows three expeditions per year to map the cave and survey for biological and geological resources. These expeditions are seven to 10 days in length.

Baseline Parameters

Before any change in the cave system can be detected, baseline data must be collected. The BLM currently has data relating to bat species and hibernation within the cave, air flow data, water quality within the cave, and preliminary information regarding microbes and minerals within Snowy River. Also available are color images of resource conditions within the cave system.

The BLM and its partners are engaged in activities to expand this data base. As these activities continue more information can be added to the base line data. The continued monitoring of these parameters should allow the BLM and its partners to detect changes within the cave system.

Limits of Acceptable Change in the Snowy River Passage

The BLM expects impacts to the calcite deposits of Snowy River by expeditions as discovery and survey continue. Examples of these impacts are mud accidentally tracked onto the calcite, cracks where the calcite deposits are thin, 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.

Without knowing the extent of the Snowy River Passage or the source of the flood water, it is difficult to define limits of acceptable change, even with baseline data available. Changes in the cave system, however, can be limited by focusing management prescriptions on the objectives listed in the Omnibus Public Land Management Act of 2009, PL 111-11, that established this NCA. Section 2203(a)(3)(A) of the Act directs the BLM to provide for “the conservation and protection of the natural and unique features and environs for scientific, educational, and other appropriate public uses of the Conservation Area.”

Until exploration of the passage and the biological, cultural, and geological surveys of Snowy River are complete, the acceptable changes in the cave will be limited to those impacts associated with these activities and the recreational visits to Fort Stanton Cave.

White-Nose Syndrome Decontamination Protocols

The efforts to prevent the spread of white-nose syndrome may close Fort Stanton Cave to recreational visits. Administrative trips, such as survey and scientific research, will continue but will follow the decontamination protocols listed below.

New Mexico BLM, Roswell Field Office, is one of the first federal agencies west of the Mississippi to initiate strict decontamination protocols for cavers and scientists entering BLM caves in an effort to slow the possible spread of fungal spores by human traffic. These include sterilization of all cave clothing and equipment with antibiotic solutions before and after entering caves in New Mexico - http://www.blm.gov/pgdata/etc/medialib/blm/nm/programs/recreation/rec_docs/rec_docs_roswell.Par.31837.File.dat/BLM-WNS-Flyer.pdf and Roswell Field Office permits. See also Appendix 1 for an example of a cave permit with decontamination procedures.

The U.S. Fish and Wildlife Service has provided strict guidelines for decontamination of all equipment taken into bat caves - http://www.fws.gov/northeast/whitenose/FINALContainmentandDecontaminationProceduresforCaversJune2009.pdf

Cave Conservation and Restoration

Cave Restoration is performed to remediate areas that have been damaged, to those areas to a more natural appearance and to minimize future damage. Remediation may include but is not limited to: removal of trash, graffiti, mud, and repair of broken formations. Care should also be taken to protect microbiology by not using toxic chemicals or leaving debris such as sponge crumbs or brush bristles in the cave.

Remediation and restoration work is a complex issue. The BLM uses a National Speleological Society publication entitled *Cave Conservation and Restoration*, edited by Val Hildreth-Werker and Jim C. Werker (Werker, 2006). The BLM uses this publication as a guide for methods and techniques on the NCA.

Cave Conservation and Restoration contains current concepts and practices in cave conservation:

- Identifying/protecting cave resources
- Establishing limits
- Monitoring impacts
- Defining management standards.
- Improving ethics.
- Tools and proven methods for cave restoration other than speleothem repair
- Cleaning cave features
- Removing artificial fill and debris
- Controlling organic nuisances
- Organizing cave projects
- Repairing speleothems.

For every cave-related decision, the foremost concern is protection of the cave resource. Thus, referring to the Werker's book is how the BLM and its partners address both general and detailed approaches, although there are certain Fort Stanton Cave-specific techniques that are documented separately by the Fort Stanton Cave Study Project (FSCSP), such as how to clean the Snowy River calcite formation or techniques for repairing velvet formations.

The FSCSP has members who are very familiar with restoration techniques and the Roswell Field Office uses volunteer agreements with FSCSP memebers for locations throughout the NCA. FSCCP member Jennifer Foote is the lead for restoration and she has worked with the field office cave specialist to develop restoration kits that are carried by any and all teams for work in Snowy River. The FSCSP has

written guidance for Snowy River teams regarding when to stop and do immediate remediation of damage caused by team impacts. The FSCSP will include as a page in survey booklets, survey kits and restoration kits a one-page bulleted check-list.
Items on the checklist include:

- Restoration activities at specific locations are approved by the cave specialist.
- A report documenting restoration activities and hour worked, including before and after photos will be submitted.
- If, restoration is not possible (such as breaking through the calcite surface or broken "Easter eggs"), then the impacts are to be documented in the report.
- When possible, restoration locations are tied to the cave survey stations.
- Restoration tool kits at a minimum should include tweezers, brushes with a range of bristle strength, spray bottles with water, sponges, and sealable trash bags of various sizes.
- For all teams working in Snowy River:
    - Both the FSCSP and the BLM insist on restoration when impacts are noted in Snowy River.
    - Each team should carry a miniature restoration kit which should include a minimum of tweezers, toothbrush, a spray bottle, a sponge, and a Ziploc trash bag. .
    - Teams should have at least on experienced cave who can serve as mentor for the less experienced to prevent impacts that would need restoration.
    - All survey teams are expected to clean up debris in Snowy River when it occurs as well as restoring impacts from their trip.

Cave restoration involving cultural resources is performed with the approval of archaeologists. Prehistoric markings and historic artifacts over 50 years old cannot be disturbed without approval and can be difficult to see.
The best management practice on restoration is demonstration of the process. Following are examples of a Fort Stanton Cave/Snowy River restoration report from 2006.

Trip Report: Snowy River Restoration, June 6, 2009

Jennifer Foote, John Lyles, James Hunter, Tanya Pietas, Laura Stark, Kristin Johnson

Objectives

1. Clean Snowy River North
2. Assess restoration needs
3. Cave diver assessment of Crystal Creek Sump.

Accomplishments

- Completed restoration from SRN 76 to 70.
- Assessed sump at Crystal Creek.
- Assessed future restoration needs from SRN 76 to SRN0.
- A desiccated centipede was stuck on a piece of SR calcite-covered rock near SRN73. See photo below.

Recommendations for All Trips to Snowy

1. At least one person must be experienced with the section of Snowy River to be travelled.
2. The trail cannot be flagged for delicate hazards and impact is occurring at a fast rate.
3. It is important that everyone check their shoes frequently and clean them as needed.

4. People need to eat over bags and otherwise be very sensitive to the environment they are travelling in. Mold was observed at the Mud Turtle changing zone and growing sprouts were found at the Lincoln's Bathtub changing area, (see photos).
5. Shoes should be soft soled, but Crocs may be too soft soled. Hard soled shoes do not distribute weight well and lead to more breakage of delicate areas that must be crossed. This is most important on the section from Snowy Rapids to Lincoln's Bathtub.
6. Pants, packs, kneepads, and gloves should be newish/free of loose threads.

Recommendations for Future Restoration Trips

1. Ensure that at least half of the people are experienced with restoration. The area is delicate and doesn't clean easily, so having a high percentage of "mentors" is important.
2. The Snowy River passage has high, medium and lower impact areas.
    a. High impact areas could take several trips to fully clean even 50', but future impact can be improved quickly by removal of mud chunks.
    b. High impact areas are concentrated at crawls with dirty ceilings, areas with mud filled "Easter eggs" in the north, areas with thin crusts such as pool basins and edges, and changing areas.
    c. Medium impact areas could have restorers spread out over several hundred feet of passage.
    d. Low impact areas could have a team of six spread out over even larger areas, this could require that each member of the team have some experience with restoration since there is less ability to communicate.
3. Do not send teams linearly to perform restoration, send teams according to their abilities.
4. Snowy River has some areas of delicate crystals, thin crusts, and some of almost crystalline rock. Restorers should be prepared for all, and have brushes with strong bristles as well as soft bristles.
5. Be gentle and be prepared for areas that that can't be restored like broken "Easter eggs" and calcified stains.
6. Far north in SR, there are large dry basins that have had much silt deposited and calcified since 2003.
    a. They are no longer ivory or off white, but are instead gray and tan.
    b. The floors of these basins are more delicate and tend to crack.
    c. It is recommended to investigate a form of trail marking (not flagging!) to guide cavers, as well as more guidance on walking carefully here. These basins should be left alone due to the natural dirtiness.

Future Work Areas

1. SRS – several areas are known to be "high impact", many areas of medium and low impact.
2. SRN – some "touch up/detail" resto possible from SRN 70 to 73, but should be considered done.
    a. 69-70 high impact.
    b. 69-45 light/medium impact.
    c. Station 44 (rock climbover/pool) med/high impacts.
    d. Station 43-3 light impact.
    e. Station 2 HIGH impacts (belly crawl).
3. Some spots remain at boat ramp area for touch up.

Volunteer Time

In cave= 9 am to 8 pm= 11 hr. x 6 people=66 hrs.

Driving time= Jen-6 hrs., John-6.75 hrs., James – 7 hrs., Laura - 2.75 hrs., Kristin – 6 hrs., Tanya- 3 hrs.=31.5 hrs.

Estimated prep, clean/deacon, and report time= 2 hrs. each x 6 people + 10 hrs. reports =22 hrs.

TOTAL Volunteer Hours=119.5 hours

Trip Report and Photos:

It was also noted that the water monitor at Mud Turtle has rusty clamps that may impact the stream or floor.

At station SRN44 (*Snowy River North* toward Government Spring) we discussed the previous recommendation that a change to socks was not needed and decided that a change of shoes is needed as well as restoration at this area. A prior team had climbed over the rock covering SR with their clean shoes on, causing much new impact since 2008. Boot covers or possibly a bridge could be used here. The downstream transition to Snowy River is athletic.

Mold at the Mud Turtle changing station

James helps with the shoes. We arrived at Lincolns Bathtub SRN 75/76 around 1 pm. At the changing spot we discovered some growing sprouts which must have been left as seeds by a recent team.

Dirty tarp at the Lincoln's bathtub changeover. The sprout was found near the bottom left in this photo.

In addition the changing tarp at Lincoln's bathtub was very dirty (unusable in clean mode). The dive assesment team spent some time cleaning the tarp with a whisk broom, water and a sponge. A substantial amount of loose dirt was also removed from the formation here.

Broken "Easter Egg". These sources of mud can't be removed and will be future sources of impact if people don't watch their footing and clean their shoes and any impact from mistakes.

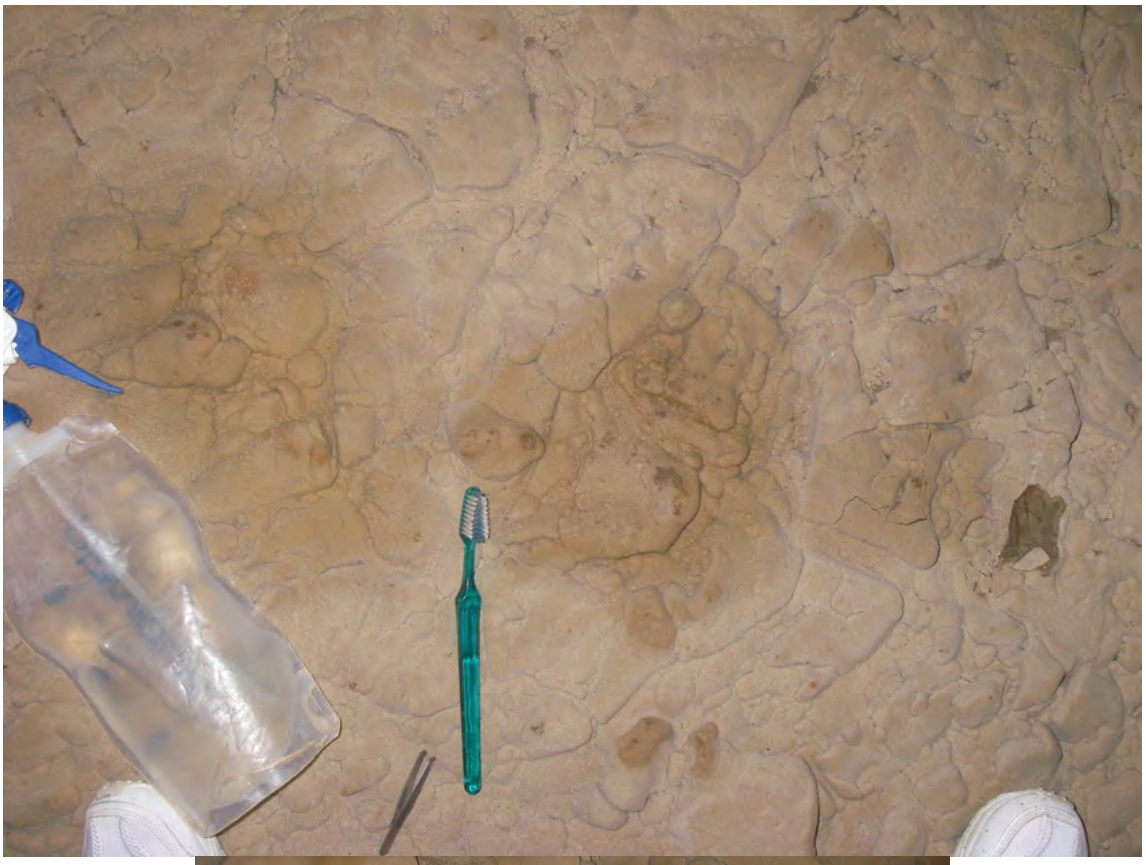
Hard at work. Note the area of broken crust on the left. This probably cannot be repared. Due to the lack of trail markings it is very important that someone who has been north before and remembers the path be on each team so they can avoid further damage of this nature.

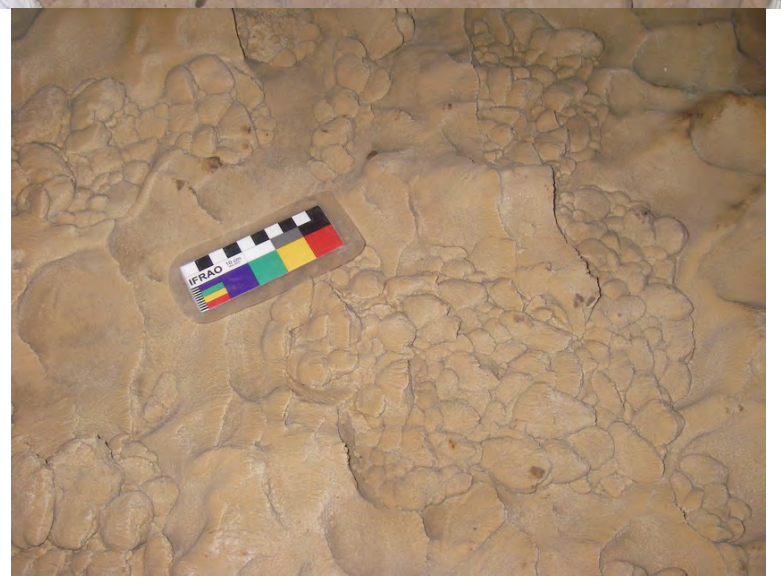
Tanja Picking up mud pieces in an area with numerous easter eggs. Note the tracked mud footprint on the snowy river surface.

Before and after SRN 75

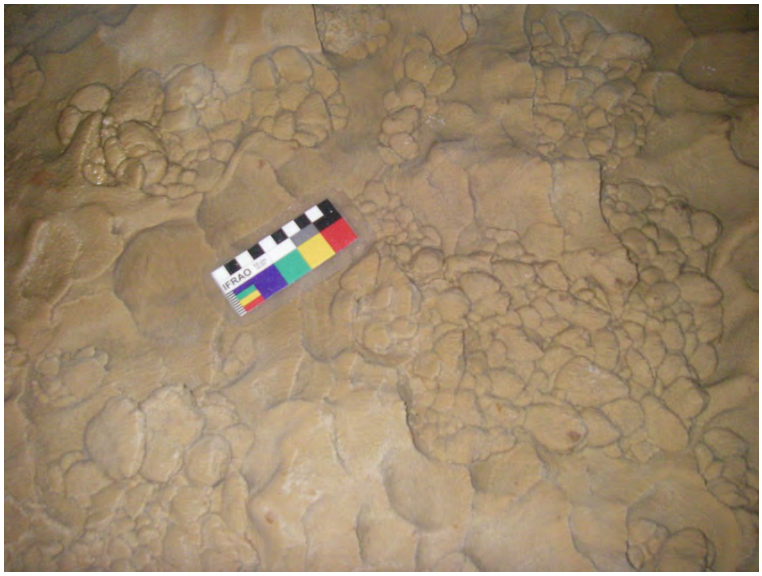
Black lint near station SRN 75

Before and after (the wet spots will dry). – note broken "Easter egg" on right of photo below which cannot be repaired. In many areas the staining on the calcite can't be removed.





Before and after near SRN 75, very fine grain crystals on river



Lint near SRN 74

Before and after restoration

Some staining could not be removed, but chunks that will spread were removed.

Removal of footprints near SRN 74.

SRN 73 before and after, "heavy" impact

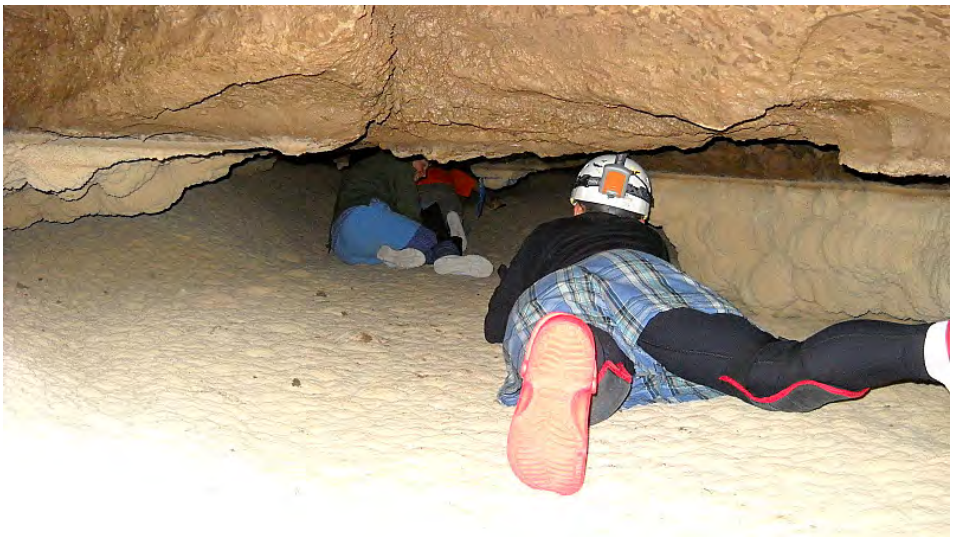
Laura working at area of "medium/heavy" impact

Cleaning

Desiccated centipede 5'from SRN73 located a few inches below the mud/ Snowy River water line on the west (left side facing downstream).

Blue lint

Sinkhole or spring? At SRN28



Future work area at SRN2

Laura, Kristin, Jen cleaning. We decided in this area of high impact SRN 76 to 74, to concentrate on removing chunks that could be spread further instead of getting it perfect and only cleaning 50 feet in one day.

APPENDIX 4

OMNIBUS PUBLIC LAND MANAGEMENT ACT OF 2009

PUBLIC LAW (P.L.) 111-11

SUBTITLE C – FORT STANTON-SNOWY RIVER CAVE NATIONAL CONSERVATION AREA

Subtitle C--Fort Stanton-Snowy River Cave National Conservation Area

SEC. 2201. DEFINITIONS.

In this subtitle:

(1) CONSERVATION AREA- The term `Conservation Area' means the Fort Stanton-Snowy River Cave National Conservation Area established by section 2202(a).

(2) MANAGEMENT PLAN- The term `management plan' means the management plan developed for the Conservation Area under section 2203(c).

(3) SECRETARY- The term `Secretary' means the Secretary of the Interior, acting through the Director of the Bureau of Land Management.

SEC. 2202. ESTABLISHMENT OF THE FORT STANTON-SNOWY RIVER CAVE NATIONAL CONSERVATION AREA.

(a) Establishment; Purposes- There is established the Fort Stanton-Snowy River Cave National Conservation Area in Lincoln County, New Mexico, 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.

(b) Area Included- The Conservation Area shall include the area within the boundaries depicted on the map entitled `Fort Stanton-Snowy River Cave National Conservation Area' and dated December 15, 2008.

(c) Map and Legal Description-

(1) IN GENERAL- As soon as practicable after the date of enactment of this Act, the Secretary shall submit to Congress a map and legal description of the Conservation Area.

(2) EFFECT- The map and legal description of the Conservation Area shall have the same force and effect as if included in this subtitle, except that the Secretary may correct any minor errors in the map and legal description.

(3) PUBLIC AVAILABILITY- The map and legal description of the Conservation Area shall be available for public inspection in the appropriate offices of the Bureau of Land Management.

SEC. 2203. MANAGEMENT OF THE CONSERVATION AREA.

(a) Management-

(1) IN GENERAL- The Secretary shall manage the Conservation Area--

(A) in a manner that conserves, protects, and enhances the resources and values of the Conservation Area, including the resources and values described in section 2202(a); and

(B) in accordance with--

(i) this subtitle;

(ii) the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.); and

(iii) any other applicable laws.

(2) USES- The Secretary shall only allow uses of the Conservation Area that are consistent with the protection of the cave resources.

(3) REQUIREMENTS- In administering the Conservation Area, the Secretary shall provide for--

(A) the conservation and protection of the natural and unique features and environs for scientific, educational, and other appropriate public uses of the Conservation Area;

(B) public access, as appropriate, while providing for the protection of the cave resources and for public safety;

(C) the continuation of other existing uses or other new uses of the Conservation Area that do not impair the purposes for which the Conservation Area is established;

(D) management of the surface area of the Conservation Area in accordance with the Fort Stanton Area of Critical Environmental Concern Final Activity Plan dated March, 2001, or any amendments to the plan, consistent with this subtitle; and

(E) scientific investigation and research opportunities within the Conservation Area, including through partnerships with colleges, universities, schools, scientific institutions, researchers, and scientists to conduct research and provide educational and interpretive services within the Conservation Area.

(b) Withdrawals- Subject to valid existing rights, all Federal surface and subsurface land within the Conservation Area and all land and interests in the land that are acquired by the United States after the date of enactment of this Act for inclusion in the Conservation Area, are withdrawn from--

(1) all forms of entry, appropriation, or disposal under the general land laws;

(2) location, entry, and patent under the mining laws; and

(3) operation under the mineral leasing and geothermal leasing laws.

(c) Management Plan-

(1) IN GENERAL- Not later than 2 years after the date of enactment of this Act, the Secretary shall develop a comprehensive plan for the long-term management of the Conservation Area.

(2) PURPOSES- The management plan shall--

(A) describe the appropriate uses and management of the Conservation Area;

(B) incorporate, as appropriate, decisions contained in any other management or activity plan for the land within or adjacent to the Conservation Area;

(C) take into consideration any information developed in studies of the land and resources within or adjacent to the Conservation Area; and

(D) provide for a cooperative agreement with Lincoln County, New Mexico, to address the historical involvement of the local community in the interpretation and protection of the resources of the Conservation Area.

(d) Research and Interpretive Facilities-

(1) IN GENERAL- The Secretary may establish facilities for--

(A) the conduct of scientific research; and

(B) the interpretation of the historical, cultural, scientific, archaeological, natural, and educational resources of the Conservation Area.

(2) COOPERATIVE AGREEMENTS- The Secretary may, in a manner consistent with this subtitle, enter into cooperative agreements with the State of New Mexico and other institutions and organizations to carry out the purposes of this subtitle.

(e) Water Rights- Nothing in this subtitle constitutes an express or implied reservation of any water right.

SEC. 2204. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated such sums as are necessary to carry out this subtitle.

APPENDIX 5
BUREAU OF LAND MANAGEMENT
CAVE SAFETY STANDARDS

Bureau of Land Management Cave Safety Standards

Visitor and employee safety is the foremost objective of the Bureau of Land Management's (BLM) cave management program. The purpose of the BLM' Cave Safety Standards is to establish a course of action that can be followed to assure minimal risk to people (both BLM employees and the general public) entering caves on public lands. These standards consist of Cave Safety Guidelines, Search and Rescue (SAR) Pre-Planning, and Risk Assessment.

Most cave environments are safe for human use. A safe caving experience depends on sound decisions and staying within abilities. As with any recreation activity, there may be possible risks associated with entering caves. Ill-prepared or uninformed personnel face the greatest risk in cave entry. Most cave accidents are avoidable with prior planning, training, and the use of the proper equipment. The BLM's obligation is to educate cave entrants to the extent possible so they can make informed decisions about their own welfare. Public information and education efforts will continue within funding and manpower limits.

Frequent cave entrants are usually informed and aware of most of the inherent risks that may exist in caving activities. The BLM entered into a Memorandum of Understanding (BLM-MOU-WO 250-2007-01) with the National Speleological Society (NSS) for assistance with managing cave resources. This MOU provides for cooperation between the BLM and the NSS local chapters for the cooperative development of cave safety plans including standards for equipment, experience, and rescue procedures. The NSS's affiliated Grottos or local caving groups associated with the NSS should be contacted when information is needed on the locations and risks associated with caves in your area. The NSS has Grottos in 47 States; a list of the Grottos can be obtained from the NSS. The NSS National Office may be reached by phone at (205) 852-1300 or via email at nss@caves.org. The web site address is http://www.caves.org. The local caving community can assist the BLM with completing cave safety analysis and by making recommendations for personal protective measures for cave entry.

CAVE SAFETY GUIDELINES: The following guidelines will serve as a recommended course of action for BLM employees:

1. The local NSS affiliated grotto should be contacted to assist the BLM in conducting a uniform safety analysis for each cave under BLM administration. The results of this analysis should be utilized to implement visitor awareness by informing all cave users (BLM and general public) prior to entry into the cave.

The BLM will take the necessary steps to inform and educate cave visitors of the steps necessary for a safe trip. These steps will include a list of known safety risks to inform the visitor of cave use authorizations, cave use registration stations, and cave entry signs. Some caves may require additional monitoring to reevaluate conditions.

2. A cave search and rescue workshop should be attended (or hosted by offering facilities or organizational assistance) by BLM cave specialists and other personnel responsible for cave use administration. These cave search and rescue Workshops are sponsored primarily by the National Cave Rescue Commission, the National Outdoor Leadership School, National Park Service, and County or State Search and Rescue Groups. These workshops, lasting from one to eight days in length, are intended to increase rescue awareness and improve coordination between rescue personnel, organizations, and agencies.

3. Training should be provided to BLM cave specialists in climbing techniques required for the safe use of caves. The BLM should take an active role by co-sponsoring and assisting in such training. Training will consist of above-ground orientation and underground experience with a qualified cave leader. Employee technical skill training and experience are essential to aid in the prevention of injures and enable employees to better judge the skills of visitors.

4. Employees will conduct underground work in groups of three or more, never alone. This also applies to volunteers.

5. Employees will lead underground operations only after receiving adequate training and having sufficient experience in the cave to be visited.

6. Training should be provided in relevant winter, desert, or other local climatic survival techniques for employees with cave management duties. Basic survival equipment will be made available to cave specialists.

7. Due to the twilight zone of caves being utilized by wide variety of mammals, reptiles, and insects, caution should be used when entering or exiting the cave to avoid potential risk. The BLM employees will be trained to avoid this risk and the proper actions to take should an employee be stung or bitten. Proper medications and first aid supplies will be made available to employees. Visitors will be cautioned when entering these areas as a part of the permitting process.

8. BLM cave specialists will receive Red Cross Basic First Aid Training or a wilderness first aid training course as soon as possible. This can be part of the annual CPR/First Aid Training offered to all BLM employees.

9. Caving and cave rescues take place in a very fragile environment. All possible care should be taken to assure that both cavers and cave rescuers impact this environment as little as possible. The Leave-No-Trace philosophy should be adhered to. Whenever possible, cave specialists are to use established trails, are not to touch formations or disturb Cultural or paleontological resources, and should carry out all wastes and trash. This includes all human waste. The disturbance or discovery of cultural or paleontological resources should be reported immediately to the BLM Field Office Manager.

10. Light sources should be helmet mounted in order to leave the hands free for negotiating the cave. It is recommended that the primary and first back-up light source be helmet mounted. The third light source is usually a flashlight on a lanyard. The lanyard should go over the shoulder and under the arm rather than around the neck.

11. In all cases of entry into caves that are heavily utilized by bats, rodents, or other animals, personnel will wear protective clothing to avoid possible health risks introduced by the animal droppings. Personnel will avoid these areas when possible.

12. When negotiating uneven or slippery cave passages, a belay should be used. Training in the proper procedure for belaying should be practiced before the trip with the device which will be used on the trip.

13. A minimal number of caves may have atmospheric conditions that are not favorable for entry. Cave atmospheres and other associated hazards will be evaluated as part of the Risk

Assessment process and handled on a case-by-case basis. These caves will be posted at the entrance, and a log kept at the area office of the inherent risks present at the time of the evaluation of the cave. A periodic reevaluation will be conducted as applicable or prior to entering by a BLM employee.

14. The Boy Scouts of America have a specific program and procedures for caving. Scouts are actually required to go through a certification process with signed documents in place prior to allowing the youth to go caving. You should verify with the Troop Leader that this certification process has taken place prior to authorizing Boy Scout's use of caves.

RISK ASSESSMENT: This section identifies state-of-the-art procedures including cave pre-trip preparation, cave use, and post cave trip follow-up procedures developed to assist in assuring safety of the cave entrants. Recommended protective measures for safe caving is the main component of Risk Assessment (RA). The Risk Assessment Checklist and a Risk Management Worksheet (BLM form 1112-5) are on file in the Roswell Field Office.

Risk Assessment is a bureau-wide mechanism to identify risks and recommend protective measures to ensure employee safety. All of the recommended protective measures in the RA can be applicable to all cave users.

This RA is not an all-inclusive analysis of the potential risks located within a cave and does not take the place of common sense that must be used by all persons who enter caves. The contents of the RA should be customized for local conditions/situations, but approval authority remains the same everywhere.

Standardizing cave entry procedures and techniques reduces both the likelihood of error and the possibility of new and unforeseen technical problems. It is expected that cave specialists will learn a set of standard procedures before adapting, tailoring, and customizing their equipment and techniques to specific locations.

SEARCH AND RESCUE (SAR) PROCEDURES/PRE-PLANNING: This section offers simple strategies for cave search and rescue planning. A cave SAR Pre-Plan consists of a recommended course of action in the event of a caving emergency and does not need to be lengthy. Having a concise and brief cave search and rescue pre-plan can save critical time during an emergency.

While the BLM will normally be in a supportive role in cave SAR operations, it should take the lead for expediency in life or death situations or when non-Bureau SAR programs are not capable of providing cave rescue service. The BLM should determine the sufficiency and availability of existing cave SAR programs and assist and support local authorities and cooperate with qualified cave organizations. To expedite SAR response, partnership agreements between the BLM and responsible authorities should be developed. Separately, the BLM should take whatever action is necessary if a SAR action involves a BLM employee.

Counties with infrequent cave SAR missions often send untrained cave rescuers to conduct cave rescues. Local training is often the most important part of a cave rescue pre-plan, because it associates the SAR team with cavers.

Each BLM field office with cave resources should have a Cave Search and Rescue Pre-plan as a part of, or addendum to, a Cave Management Plan or the District's Search and Rescue Plan. The purpose of having a Cave SAR Pre-Plan in place is to save time in the event of an

emergency. Personnel changes reinforce the need for a written, readily available Cave Search and Rescue Pre-Plan. A pre-plan is on file at the Roswell Field Office.

Guidance on the recommended formats for cave search and rescue pre-plans, documentation sheets for overdue, lost or injured cavers, and a cave search team debriefing report has been provided to BLM field offices.

Training

Internal training begins with familiarization with the written pre-plan by dispatchers and BLM staff. A next step is having the BLM staff read appropriate parts of Cave Rescue Techniques. The staff should be comfortable with the first four chapters and aware of the rest of the book as reference material. Finally, a simple mock cave rescue by the local SAR team may be the most valuable preparation.

External training can be done at your site or at national seminars. National Cave Rescue Commission (NCRC) runs annual week-long cave rescue seminars and currently offers four levels of training (4 weeks total). NCRC also runs many weekend workshops. The best use of staff time may be to have an NCRC instructor offer a short workshop on your site. Inviting other local agencies to participate will help organizations coordinate and cross-train better. Other external training includes ICS training and especially, Managing the Search Function (MSF), a 40 hour NASAR course, or Managing the Search Operation (MSO), with a similar curriculum.

CONCLUSION: Risk management is the primary factor of consideration in the administration of wild cave resources for public use. While the BLM cannot make all caves completely safe for all users, a proactive cave safety policy will complement the BLM's cave management program and minimize cave accidents. Standardizing caving equipment, techniques, procedures, and training will increase cave safety. Implementing the cave safety standards discussed above can prevent most accidents; however, the ultimate responsibility for the prevention of cave accidents rests with the cave user. The BLM appreciates the National Cave Rescue Commission, the National Outdoor Leadership School, and the National Speleological Society for contributing towards the development of these cave safety standards.

Components of Search & Rescue (SAR) Pre-Plans for Caves

Importance: Pre-plans are especially important in areas with infrequent search and rescue incidents. It is important that any pre-plan is simple or it won't be used in a time of crisis. It is also important that key people (cave specialists, managers, and dispatchers) know how to quickly access the written pre-plan.

Pre-plans organize personnel and equipment for urgent incidents. They provide guidance through the initial response. For extended incidents, they are replaced by a plan drawn up during the first operational shift.

Searches and rescues are different types of urgent events. Both are emergencies since human life is at risk. The pre-plan is not supposed to provide step by step instructions for all personnel. The pre-plan is a document from the BLM resource area or district manager to his/her staff that uses the Incident Command System (ICS) to provide clear leadership and organizational guidelines in urgent situations. The document should not restate what ICS is; it is a simple document that helps organize cave rescues. The pre-plan should help the BLM field office move

fluidly in a time of urgency. There are two very different types of pre-plans, general and specific.

Contents of Cave Rescue Pre-plans

Cave Specific SAR pre-plans which are specific to one cave.

- **Cave description:** Describes the cave including temperature, humidity, flood potential, and hazards. Identify specific locations in the cave where obstacles exist that require special rope work (lift or lowering systems), what kind of system is needed, and how much rope and equipment is needed for that location. Identify other special needs or obstacles such as tight restrictions, narrow or sharply twisting passage, water passages, or special communications needs.

- **Access:** GPS coordinates need to be available. Descriptions how to get to the cave in simple terms so a deputy or cave specialist can go see if anyone's there. The closest possible landing zone should be located in the event a helicopter needs to be brought in to air lift the patient to a medical facility. GPS coordinates should be given.

- **Caver parking area:** Describes how to get to the most likely spot to find an overdue caver's vehicle. It also helps rescuers find the cave in the middle of the night.

- **Special equipment:** Includes specialized gear needed for certain passages.

General - Cave SAR pre-plans describe the BLM field office's response to any cave incident. They don't contain specific cave information, but should have a simple referencing system so the general pre-plan steers the responders to documents or people with specific information. The components to consider in a general pre-plan include:

Search initial response plan: Informs the Bureau manager or cave specialist who initially takes charge (Incident Commander) how to respond and who to initially involve. This should only be about a page long. It should be the first part of the pre-plan since it describes the strategy BLM will employ.

Rescue initial response plan: Similar to the above, but specific to rescues.

Dispatcher's cave SAR "cheat sheet:" Questions to ask the reporting party.

- **Cave rescue personnel lists:** Home phone numbers.
  1. Internal
  2. Local
  3. State and Regional (have a copy of the National Speleological (NSS) Member's Manual available)

- **Cave rescue logistics**
  1. Internal
  2. Local (including County and State Emergency Management Coordinator)
  3. Regional (identify the Regional Cave Rescue Coordinator by calling the NSS)

- **Medical pre-plan**
  List of local care providers who have cave training/expertise.

- **Forms**
  1. Overdue caver questionnaire
  2. Lost caver questionnaire
  3. Injured caver questionnaire
  4. Search Team debriefing sheet (maze caves need this more than others)
  5. Master copies of cave-specific forms

- **References** (these could be kept in your Emergency Operations Center)
  1. Manual of U.S. Cave Rescue Techniques, by Steve Hudson
  2. Latest copy of the NSS Members' Manual
  3. Next latest copy of the NSS Members' Manual (format alternates annually)
  4. Any search text (e.g., NASAR Field Commander's Notebook for SAR)
  5. ICS Plans Book (contains master ICS forms to be photocopied)
  6. Appropriate phone books for local area and agencies

Distribution of the written pre-plan: The pre-plan should be kept in the dispatcher's notebook. It should also be posted on the wall in your Emergency Operations Center. The Emergency Operations Center is often either a room in the Sheriff's Office with a phone and a radio or the BLM field office.

Generic Cave Search Pre-Plan

Search is an emergency. Search management involves a sequence of steps that are started in order, with each step progressing until the situation is resolved.

The search management sequence is:

1. Pre-plan - Be prepared. Know the hazards and resources.

2. Interview - Information must be gathered from first notice. The more information, the more focused the effort can be. The investigation scales up as the search progresses and more search areas are ruled out.

3. Call Out - Trained help should be enlisted. At this stage, it is time to evaluate the urgency of the situation. This will determine the size and type of response. It is critical that in-cave tasks are dealt with by experienced cavers who can make the judgment calls needed underground.

4. Establish the Search Area - In a cave incident, we may consider the entire cave at the early stages, but should then establish segments within the cave and assign them priority or rank. We must not ignore the fact that the subjects may no longer be in the cave or that they may be in a portion of the cave not on the map.

5. Confinement and Attraction - Once you have established the search area, it is vital that you know if the subject leaves the search area. In a cave situation it is also vital that you know if the subject moves from one segment to another. Guard the entrance(s) and maintain an accurate log of who entered and who left. Place lights with notes and other attraction devices at key cave intersections so wandering searchees will stay there.

6. Hasty Search - To begin active search, the best action is to quickly check out the most likely places first. Speed is the primary objective here. Check the obvious, look for clues, report conditions.

7. Wide Search - The objective here is efficiency, not pure speed nor absolute thoroughness. Search the passages in order of priority segments. This allows for search of the maximum amount of cave with the cavers on the scene in the fastest time possible. The process can be repeated for increased coverage if needed.

8. Grid Search - As a last resort before suspending the mission, a grid search can be conducted. Grid searching is slow and highly labor intensive, and it is important that teams mark the territory covered in some way. You may have to mount a clean up trip later to remove all of the notes and flagging. In a complex cave system this process could take a huge number of people an incredible amount of time.

9. Rescue/Suspension - Whatever the method used, the goal is to find the person or determine that they are not within the search area. If found, the exercise becomes a rescue or recovery operation. The options if they are not located are to expand the search area (e.g., to some other cave or some part of the cave we do not know) or to simply scale down the operation. The object is not to quit, but to scale back. The decision to scale back is a tough management decision and should be carefully documented.

10. Critique – Identify the problem areas and the efficiencies; what worked and what did not work. How can the cave search be improved the next time?

APPENDIX 6

Comments on the Draft NCA Plan

APPENDIX 6

Comments on the Draft NCA Plan

A. Cave Access

Comment: Requiring a BLM approved guide beyond Hell Hole gate is excessive.
Response: The BLM disagrees. The BLM routinely grants approval for individuals and organizations to conduct activities on public land. Examples include the companies conducting archeological surveys prior to surface disturbing activities and biologists surveying for the presence of special status species. Having a guide approved by the BLM for parties travelling beyond the Hell Hole gate would increase the opportunities for monitoring conditions in the cave and reduce the impacts of those visitations.

Comment: BLM should allow recreational access to Snowy River Passage.
Response: See Appendix 3, Implementation, for the criteria that would allow recreational visits to the Snowy River Passage.

Comment: There should be a Limits of Acceptable Change study done for cave capacity.
Response: Appendix 3, Implementation, for the criteria for changing the number of visitors allowed in Fort Stanton Cave. Applying the criteria to monitoring data over time, the number of visitors allowed into the cave may vary or even exceed the numbers of currently visitors allowed. Changes in the number of visitors allowed will be based on monitoring data.

B. Cave Fees/Campground Fees

Comments: The majority of cavers do not accept the concept of fees to access caves and generally do not want nor need interpretive materials or desire improvements.
Response: The BLM has discretion about establishing use fees or fee areas on public land. Among the purposes of establishing such areas is to recover part of the costs to manage such areas. Administration of the cave permit program is no different than any other BLM program involving permits since there is a cost associated with managing that program. Any fee area proposed would have to adhere to the provisions of the Federal Land Recreation Enhancement Act (FLREA) of 2006. Alternative A (Preferred) does not contain a provision for requiring a fee to obtain a recreational cave permit.

C. Portal Access

Comment: There is no justification for portal access.
Response: Under Alternative B, no portal is being considered. Under Alternative A & C a portal would be used to reduce impacts to fragile formation and to facilitate rescue. Having a portal would also help in scientific investigations such as continued exploration, installation/retrieval of scientific instruments and monitoring. Justification for constructing portal access for the Snowy River Passage can be found in the Draft NCA Plan on pages 21, 22, and 46-48.

Comments: New entrances would allow lifting this seasonal closure, improving the efficiency of all activities in the cave. Therefore, all alternatives should allow considering access portals.
Response: See revised text in Alternative A (Preferred) of the Proposed NCA Plan.

Comment: The city of Ruidoso has considered drilling water wells, will this have an impact on the SnowyRiver.
Response: See page 32, Water Resource Management – Surface Water and Groundwater management objectives of the Proposed NCA Plan.

Additionally, the mapping of the full extent of Snowy River Cave Passage has not yet been completed. If the discovery is made that Snowy River Passage is located below the VOR airport property then it is possible that the new drilling of groundwater wells on the Village of Ruidoso airport property may impact un-mapped Snowy River Passage located below the Village of Ruidoso airport property. However, possible impacts to Snowy River Cave Passage from drilling new groundwater wells remains unknown until the full extent of Snowy River Cave Passage is mapped. In the event that Snowy River Cave Passage does extend beneath the Village of Ruidoso airport properties then the BLM would try to enter into a conservation or cooperative agreement with the Village of Ruidoso to avoid possible impacts to Snowy River Cave Passage located below the airport properties.

D. Cave/Cave Impacts

Comment: Most Flagging tapes that I have seen which have diagonal striping on them are susceptible to disintegrating in a very short period of time. Once the tapes disintegrate the resulting residue may be harmful to some cave life forms.
Response: Procedures for flagging have been changed in the methods for flagging. Flagging materials that do not disintegrate are now being used. See Appendix 1.

Comment: The repeated mentioning of a human vector is not based on scientific fact or pathological evidence.
Response: Human vector statement has been removed from the document.

Comment: There is currently an artificial, constructed entrance into Snowy River, it is in the Don Sawyer Memorial Hall. Please correct this sentence to reflect the newly constructed access Structure.
Response: Changes made on page 54.

E. Mineral Extracting/VRM Constraints

Comment: Extracting mineral resources should not be allowed in the NCA due to VRM constraints.
Response: See revised text in Alternative A (Preferred) of the Proposed NCA Plan

Comments: There should be no overhead structures allowed at all, regardless of height.
Response: The fifteen-foot height limitation was included in an attempt to limit development

within the NCA. Disallowing all overhead structures regardless of height precludes the BLM from utilizing photo-voltaic panels to power electric pumps for the NCA wildlife water system and providing electric power host sites at prospective recreation areas.

F. Name Change

Comment: Fort Stanton-Snowy River Conservation Area should have its name changed to Fort Stanton National Conservation Area.
Response: The name Fort Stanton-Snowy River National Cave Conservation Area was designated by Congress in the enabling legislation. The BLM does not have the authority to change the name of the NCA.

G. Water Management

Comments: What are the water resource management direct and indirect effects.
Response: Surface disturbance from surface disturbing activities such as the development, construction and maintenance of groundwater wells, groundwater monitoring wells, roads, trails, pipelines, power lines, and campgrounds can result in degradation of surface water quality and groundwater quality from non-point source pollution, increased soil losses, and increased gully erosion.

Potential direct impacts that would occur include increased surface water runoff and off-site sedimentation brought about by soil disturbance; increased salt loading and 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.

Petroleum products and other chemicals, accidentally spilled, could result in surface and groundwater contamination. Authorization of the proposed projects would require full compliance with BLM directives and stipulations that relate to surface and groundwater protection.

H. Wild and Scenic Rivers

Comments: BLM should recommend that segment 1 of the Rio Bonito as inventoried, and be tentatively classified as Scenic River Area in the NWSRS.
Response: On page 45 of the Draft NCA Plan details the rationale for the recommendation to not include Segment 1 of the Rio Bonito in the National Wild and Scenic River System:

> "Since this river falls within a National Conservation Area it is already afforded a high degree of protection. 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 private land. The BLM is limited in its ability to protect the river flows due to this upstream allocation."

I. Environmental Analysis

Comment: The Current EA does not identify of incorporate by reference any of the analysis documents related to the plans identified and therefore the analysis is deficient for the current EA.
Response: The Plans identified for incorporation by reference are noted in section I. G and references throughout the plan where appropriate for analysis. These plans are also specifically mentioned in section II. B Management Common to All Alternatives. Most of the analysis is not incorporated by reference by tiered to the Roswell RMP, which this plan is slightly amending. Rather than be repetitive of all of this analysis the RMP and other NEPA documents are referenced where appropriate to reduce repetition

Comment: It is the citation and summary of incorporated material which is missing and flaws the analysis in the current EA.
Response: See above comment response

Comment: The EA analysis is flawed because it does not clearly identify the known or predicted effects of the various alternatives relative to the issues. What are your measurement indicators?
Response: The level of analysis is commensurate with the level of detail in the decisions being made. Many of the decisions are implementation level decisions which would require additional site-specific analysis at the time of implementation.

Comment: At least, a summary of the mitigation effects from previous environmental documents should be included in this EA. Provide additional information on the mitigation measures necessary to protect natural resources, especially concerning cave resources, water, hydrology, OHV use, and to ensure that such mitigation is feasible. Only analysis section which discusses mitigation actions is the cave portal protocol
Response: These mitigation measures are available in the referenced documents and it is not necessary to repeat them here.

Comment: On page 4 it is stated "Protect the biological, archaeological and scenic qualities of Fort Stanton, while providing for quality recreation opportunity." Since the keynote of the NCA is the Snowy River passage I think it might be appropriate to also mention protection of the water resources.
Response: This is a direct reference of the previous ACEC management goal.