

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- A. Permitted caves are withdrawn from public entry except by permit to protect very fragile, very sensitive areas and resources.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 obstruction 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 to 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 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 (PI 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 to 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.
- Inclinator 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

Standard Cave Symbols					
	Surveyed Cave Passage		Slope: Lines Diverge Downhill		Stalactite
	Sketched Cave Passage		Abrupt Drop in Floor		Stalagmite
	Indeterminate Wall		Pit		Column
	Unexplored Lead		Canyon in Floor		Soda Straws
	Pinches Out		Abrupt Drop in Floor		Flowstone
	Too Low		Dome		Rimstone Dam
	Flowstone Choke		Ceiling Channel		Drapery
	Breakdown Choke		Natural Bridge		Shield
	Underlying Passage		Large Breakdown		Aragonite
	Bedrock Pillar		Small Breakdown		Popcorn
	Survey Station		Gypsum		Boxwork
	Passage Height		Sandy Floor		Helictite
	Improved Trail		Clay or Silt Floor		Gypsum Flower
	Unimproved Trail		Ponded Water		Moon Milk
	Cross Section		Guano		Spar
	Snowy River Floor		Ladder		Hand line
	Gate		Bats		Utility Shaft

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:	<i>SRP ADMINISTRATIVE - CAVES</i>
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, <i>Cave Specialist</i> 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 <i>RISK & SPECIAL STIPULATIONS SHEET – FORT STANTON CAVE</i> for this authorization. <i>TRIP MEMBER SIGNATURES</i> - 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 decontaminated 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 decontaminated 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 of 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.

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.

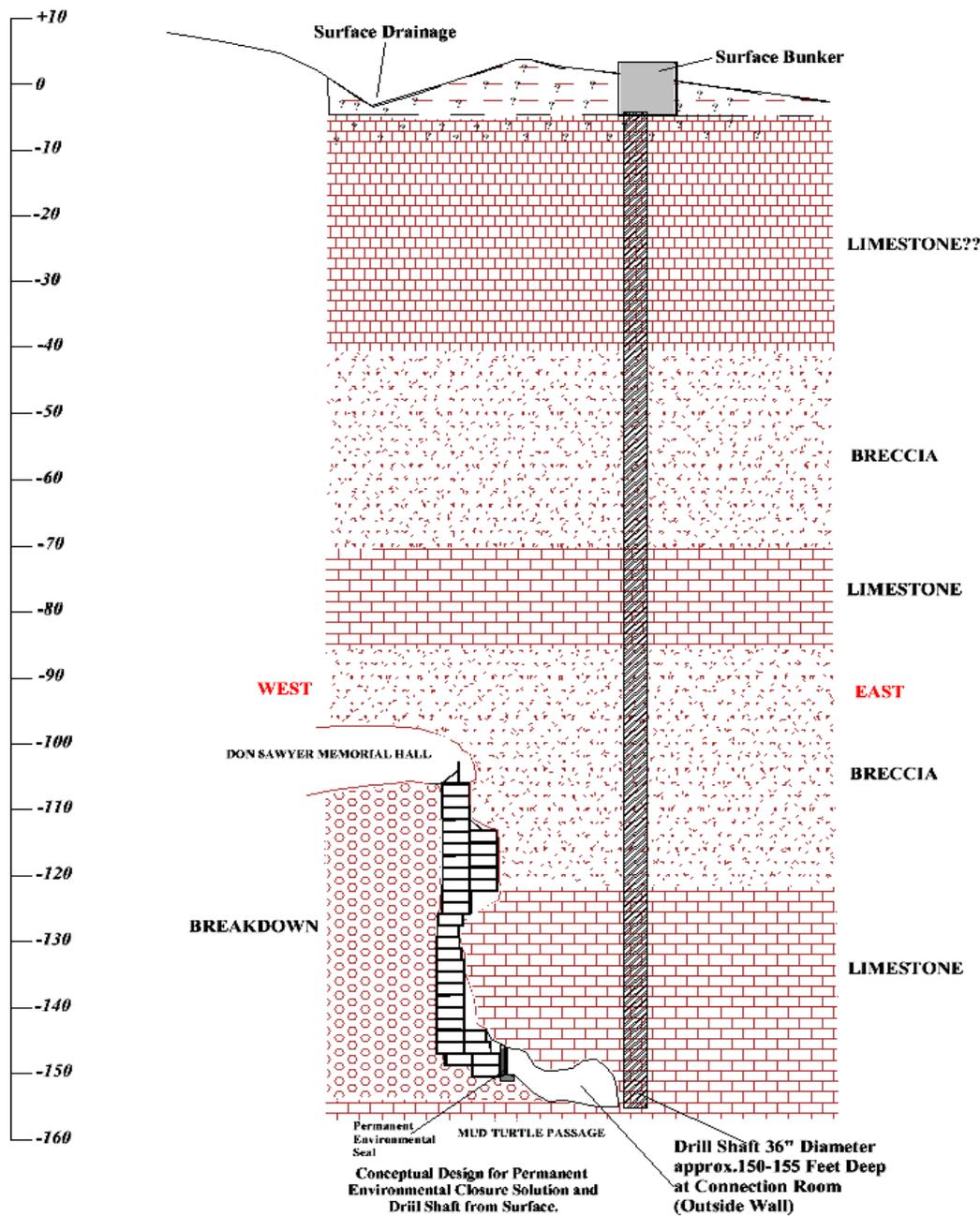


Figure 1. An example of drilling a shaft off-set from the cave passage.

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 members for locations throughout the NCA. FSCSP 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 climber/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.



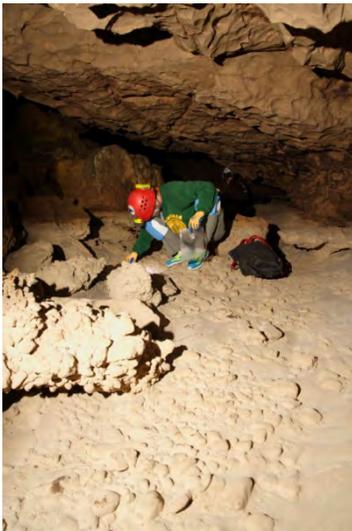
In addition the changing tarp at Lincoln's bathtub was very dirty (unusable in clean mode). The dive assesment team spent some time cleaning the tarp with a whisk broom, water and a sponge. A substantial amount of loose dirt was also removed from the formation here.



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 repaired. 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

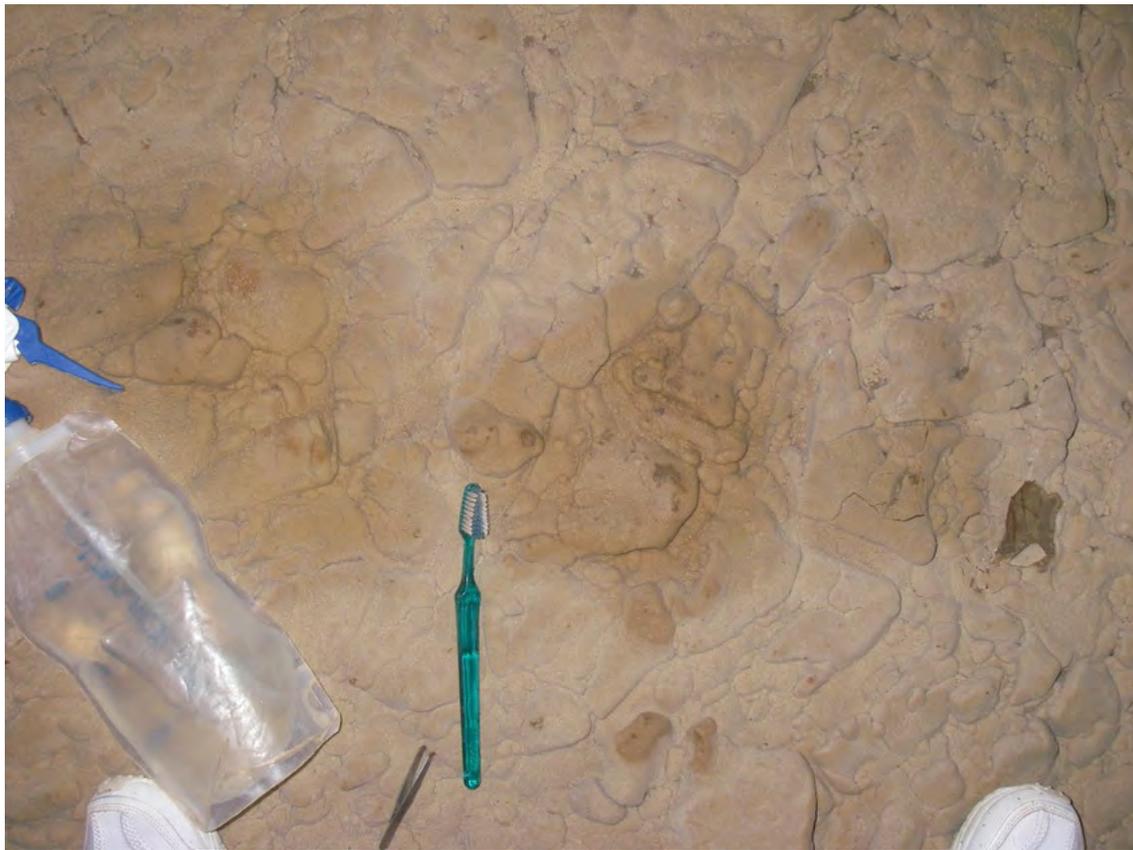




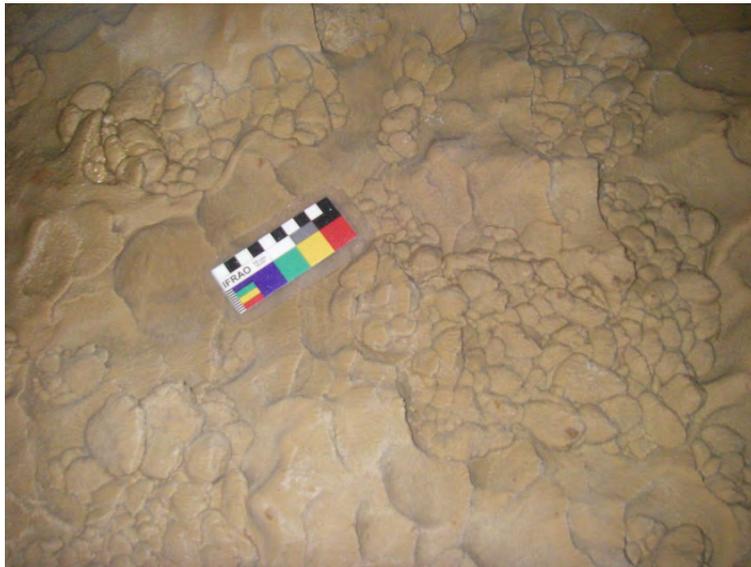
Black lint near station SRN 75



*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



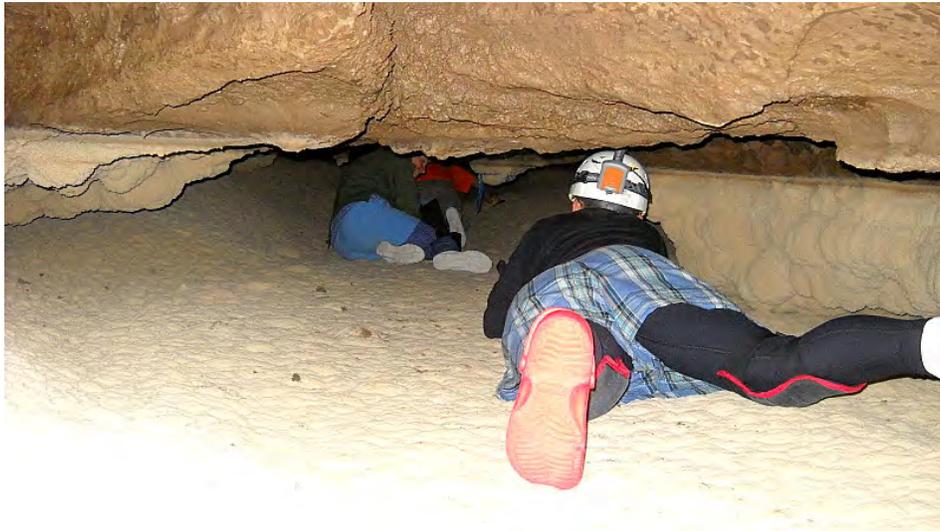
Desiccated centipede 5' from SRN73 located a few inches below the mud/ Snowy River water line on the west (left side facing downstream).



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

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 injuries 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

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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 or 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 but is 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.