

ATTACHMENT A

NPS RESPONSES TO PUBLIC COMMENTS AND ERRATA For The CAVE AND KARST MANAGEMENT PLAN / EA

In response to the Cave and Karst Management Plan/EA, the NPS received 15 comment letters (two of which were from the same commenter). Described below are the substantive comments and the NPS responses. The comments include the initials of the parties making the comment (the names and initials of commenters are found at the end of this document).

Comment 1

Page 13 - Impact Topics Dismissed from Further Consideration: Paleontological deposits are listed only as the one vertebrate location near the historic entrance. The Madison (Pahasapa) limestone is very fossiliferous and includes excellent Mississippian crinoids, bryozoans, corals, and other paleontological materials. Passage modification, and travel through cave passages could potentially have an adverse effect on these resources. (PB)

When found, paleontological resources will be documented in the Cave Feature Inventory. Trip leaders will be trained to recognize these resources and avoid disturbing or damaging them. If that is not possible, then all activity in the area will cease, and the discovery will be reported to the Cave Specialist, who will contact the NPS Geologic Resources Division, as needed.

Comment 2

Discovery of New Caves: “When a new cave is discovered, it would be immediately reported to the Cave Specialist. The cave would be given a name...”

Cave names must conform to geographic naming policies of the NPS. (PB)

All actions will conform to existing policies.

Comment 3

Discussion of water flow only considers modification of water flow inside of the cave and not modifications to water flow on the surface that affect cave resources. The impacts on hydrology from road construction/realignment and facilities are mentioned briefly in other sections. The impact of pesticide use is also mentioned, but there should be a more comprehensive discussion on impacts to water flow from surface activities. The effects of fires (natural and resource use), fire control, revegetation, and outside impacts (development on adjoining private land) are not considered. (PB)

Except for four small springs, there are no surface water resources within the monument. Jewel Cave Spring was developed in the 1930s and does not presently have surface flow; it is not certain that it ever did. Three springs were extensively monitored for water quality for three years in the early 1990s. The resulting data has been compiled into the national STORET database. Two springs (Jewel Cave Spring and Prairie Dog Spring) adjacent to U.S. Highway

16 are subject to high chloride concentrations, presumably from highway runoff bringing in salts from winter de-icers.

Hell Canyon and Lithograph Canyon are subject to occasional flash flooding, particularly during the spring rains and snowmelt. Flash flooding was especially prevalent in the first few years after the Jasper Fire of 2000.

Past fire suppression contributed to intensity of the Jasper Fire. Because the fire destroyed more than half of the Monument's Ponderosa pine forest, more water was expected to infiltrate into the cave. This was not observed, probably because 2000 was the beginning of several years of drought, and in spite of an increase in the frequency and magnitude of flash flooding – even across the surface above known cave passages.

Although it is likely that the fire caused changes in the groundwater chemistry, these were not expected to differ from changes caused by previous fires, and no cave water was sampled to detect changes.

This year, the Monument will begin implementing a new Fire Management Plan that will strive to restore natural vegetation and reduce the chance of catastrophic fire. Both will have a beneficial impact on water quality and distribution, both on the surface and in the cave.

The volume, distribution, and quality of water entering the cave can be impacted from surface developments: covering the land surface with impermeable construction material, changing natural topography or vegetation, disrupting natural rock and sediment layers, or introducing contaminants.

Changes in the amount of cleared area, type of vegetative cover, or upgrading of Highway 16 could change the absorptive capacity of the soil – and runoff/infiltration patterns, intensity, and duration – which could impact water quality of springs in the Monument on both surface and in the cave.

The cumulative impacts section of the water resources analysis in the Environmental Consequences chapter has been re-written and is incorporated in the EA via these errata as follows:

Cumulative Impacts

Past relocation of the visitor center, park housing and supporting facilities, tended to increase the potential for impact on water infiltrating from the surface to the cave. This is because the newer area has more and larger buildings, and a larger parking lot and road system. These redirect the natural flow of surface water, and tend to degrade the water quality because of contaminants associated with automobiles, asphalt surfaces, sewage leaks and the occasional use of de-icer.

However, that action did reduce the sewage running into a buried septic system. Currently, virtually all water used at the Monument is directed to a sewage lagoon, and does not enter the

subsurface. The lagoon also prevents the entry of natural water through the surface area where it was constructed.

Normally-functioning water and septic systems pose no threat to cave resources, but their active use creates a potential for problems, because they eventually deteriorate and leak. Removing a portion of the seasonal housing parking lot has had a long-term beneficial impact to cave resources, but did not result in detectable changes in water quality or distribution within the cave.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection; the chemicals constituting the foam are biodegradable, non-toxic, and were used in relatively low concentrations. Though no in-cave drip sites were sampled for contamination, it is the professional judgment of the cave resource staff that this resulted in a short-term negligible beneficial impact.

Runoff from the highway carries winter road salt into the groundwater believed to be responsible for chloride concentrations that exceed drinking water standards at one in-cave site.

For both alternatives, all surface disturbances would be limited to the developed zone established by the Monument's General Management Plan. Whenever possible, they would be made in areas of previous disturbance. All surface disturbances would be subject to NEPA compliance that specifically addresses the preservation of natural water quality and surface/subsurface drainage patterns. Chemicals used for removing ice, preserving power poles, installing underground utilities, etc., would be limited to the minimum amount and least toxic substance required to do the job. Fire would be managed/controlled to reduce artificial impacts and restore natural vegetation. The Monument would continue to consult with the Forest Service concerning surface activities that could adversely affect the cave/karst system, would pursue opportunities to reduce the risk of impact in areas of new development.

Comment 4

The EA does not really mention the overall cumulative, major beneficial impact of gaining knowledge about the cave, its extent, the geology, the hydrology, etc. as part of the why the park would allow impact to virgin areas. (PB)

The mission of Jewel Cave National Monument is to preserve Jewel Cave, through management of the surface and subsurface ecosystem, while providing opportunities for the pursuit of scientific interests and public enjoyment. Exploration, research, recreation, and orientation trips provide major benefits in all these areas and supply information that can be used as tools for protection of both the known and unknown portions of the cave.

This cannot be done without some impact; but with proper training of trip leaders, appropriate standards for collecting and processing data, and the establishment of monitored travel corridors, the adverse impacts can be kept to minimal levels. Thus, the benefits will outweigh the adverse impacts, and the adverse impacts will never accumulate to the point of impairment.

Comment 5

Appendix B – Cave Rescue: The Monument may want to consider development of SAR pre-plans for the heavily traveled areas, starting with the tour routes (paved and wild tours) and working towards having them for all of the major caving routes. (PB)

This has been considered and a proposal submitted for funding to develop a Cave SAR Pre-plan.

Comment 6

Appendix G: You may want to explicitly state that all survey notes, sketches, inventory data, etc. are the property of the park. Many people do not necessarily know that they are agreeing to this by signing a volunteer agreement. The Monument may want to include additional information on data collection, error checking, processing, storage, backing up, and archiving. It is important to document how the data (digital and paper) is stored and what QA/QC procedures are in place. (PB)

The statement "All survey notes, sketches, inventory data, etc. are the property of the park." is added to the volunteer agreement and incorporated into the EA via these errata.

Comment 7

Appendix H – Policy for Distribution of Data: "Subsets of digital survey data may be distributed when there is a demonstrable need."

The Monument is public property and the extent of cave passage and the maps and inventory information of that passage should be public and unrestricted for anyone who requests such information. This policy highly restricts meaningful exploration of the cave and serves to alienate cavers from the Park. With a non-disclosure agreement as part of the volunteer agreement, and clearly defined penalties for "misuse" of the data, there would seem to be little reason not to allow cave explorers, volunteering for the Monument, access to these data. The need for secrecy and limiting the survey information and associated notes is not justified or appropriate; there needs to be a reasoned, logical explanation for this policy. (PB, DL, RJR, AA)

Upon request, non-georeferenced digital survey data will be distributed to trip leaders for whatever major section they are working in: Main, VISC, VACC, Calorie, Stopper, and End. As needed, sensitive areas may be designated by the Superintendent, and may result in more limited distribution.

Additional information that is available to explorers includes: finished quads (digital and hardcopy), recent drafts, PDFs of field notes, trip reports, inventory notes, and taped trail descriptions and related maps.

Comment 8

Page 2, paragraph 3 states "...justifies to the caving community why decisions are made..." Jewel Cave is a National Monument that is managed for everyone, not just the caving community. I recommend changing the statement to "... justifies why decisions are made..." and eliminating the reference to the caving community. (SA)

Agreed. The suggested change is incorporated into the EA via these errata.

Comment 9

Page 6, History states that cave camping began in 1996, Appendix C states 1997. This discrepancy should be resolved. As I recall, cave camping began at JECA in 1997. (SA)

The first trial camp was in June 1997. Based on that experience, the first and only permanent camp was established in November 1997. The date is corrected on page 6, History and incorporated into the EA via these errata.

Comment 10

Page 17, sixth bullet point states that "The "out time" should represent the actual expected time of return with no more than one extra hour of leeway."

This provision limits the discretion of trip leaders and should be omitted. Requiring expected return times to have no more than one extra hour of leeway actually detracts from having a safe cave trip. If expected return times were allowed a little more leeway it would reduce the number of times that someone has to run out ahead of the group in order to contact the surface watch. One hour of leeway is especially minimal for a four day camp trip. The amount of leeway for expected return times should not be defined by the cave management plan and instead be left up to the judgment of the individual trip leader with the concurrence of the cave specialist. (SA, AA)

The following change in the text of the EA is incorporated into the EA via these errata: "Out times will be determined by adding a reasonable buffer to the expected trip length. Trip leader training will include recommended buffers for single-day trips and for multi-day trips, but the trip leader will make the final decision."

Comment 11

On page 17, sixth bullet: "The 'out time' should represent the actual expected time of return with no more than one extra hour of leeway. All surface watches would have a copy of the current Emergency Contact Phone List. The contact would call the appropriate NPS employee no more than one hour after a caving group is past due, ..."

It is ambiguous as to whether a trip that is 'past due' refers to anytime after the stated 'out time' or after the additional 'leeway' hour. The critical last sentence should be clear relative to the actual out time, e.g. 'The contact would call the appropriate NPS employee no more than one hour after a caving group's stated out time, ...' (if that is the policy being indicated). (LS)

The surface watch should contact an appropriate NPS employee no more than one hour after the stated "out time."

Comment 12

Page 17, eighth bullet point states that "...overnight trips have a prerequisite of a trip to Seventh Heaven."

It would be sufficient to require overnight trips to have a prerequisite of a trip to Cloud Nine. All of the technical difficulties encountered on a trip to camp are encountered before Cloud Nine. After a person makes a trip to Cloud Nine, it will be quite clear as to whether they can make it to Camp since between Cloud Nine and Camp is some of the easiest traveling of any main route in Jewel Cave. (SA)

This is reasonable and the suggested change is incorporated in the EA via these errata. The policy is revised to read, "...overnight trips have a prerequisite of a trip to Cloud Nine," instead of "to Seventh Heaven." (page 17, Actions Common to All, Cave Access, bullet 8)

Comment 13

Page 18, Orientation Caving Trips states that "The trip leader would be an on-duty, paid staff member who has met the taped route trip leader qualifications for taped routes. The participants would be off-duty."

In order to give JECA more flexibility with staff, perhaps it would be better to not require that orientation trips be led by on-duty staff and that the participants be off-duty. Perhaps it would be enough to state that orientation trips are led by staff members and participated in by staff members. (SA)

The following correction to page 18, paragraph 1 is incorporated into the EA via these errata: "Orientation trips will be lead by qualified on-tape trip leaders or off-tape trip leaders. These trips would be used by the Monument as optional training/familiarization opportunities for Monument staff and cooperators. The Monument would provide some caving equipment for these trips. First-time visits would be given first consideration. The number of trips permitted per year would be established based on measured impact and management constraints."

Comment 14

For Orientation Caving trips, why does the trip leader need to be an on-duty paid staff member? There may be VIP's and other parties who could be effective in this role. (DL, Anon)

Orientation trip leaders for management-scheduled orientation trips will be paid staff members. This will be done to ensure trip leaders are available to provide Orientation trips for the Monument's summer seasonal staff. Additional orientation trips could be led by volunteer trip leaders.

Comment 15

Page 19, paragraph 2 states that "To prevent impacts to native microorganisms, or the unnatural increase of non-native microorganisms, rest stops would be made only at established areas."

This is an excellent idea and I recommend that an appendix of approved rest stops be created. I couldn't find anywhere in the plan or appendices where these rest stops were defined. (SA)

These will be provided in Trip Leader Training.

Comment 16

Page 23, paragraph 5, reads "To protect the cave, it is important that maintenance and related activities would be conducted in a manner that minimizes or eliminates impacts to the cave environment."

I applaud JECA for taking steps to minimize the impacts of regular maintenance upon the cave. Perhaps a map of approved access routes for each light fixture should be created to assist maintenance in traveling the same routes when changing lights? (SA)

This is in progress and will be available by the end of 2007.

Comment 17

Page 24, paragraph 1, reads "The maintenance staff would be aware of what is or is not acceptable for cave use and should understand that resource management staff would be consulted before using new substances or techniques for which there is any doubt."

I suggest that acceptable substances and techniques be defined in a living document that is updated as new products are created and better methods discovered. (SA)

A "living" document of in-cave maintenance procedures will be implemented at a later date.

Comment 18

Page 25 under Off-Trail Travel: "...existing off-trail routes would be treated as travel corridors defined as a system of foot trails not to exceed two feet in width with a two-foot shoulder on each side.... The shoulder area would be subject to impact from airborne lint, dust, and fine sediments."

The concept of cave trails having a "shoulder" is vague, confusing, and could lead to resource damage if poorly interpreted. The term "shoulder" implies that resting or standing would be appropriate use, when all impact should be limited to the trail. Lint can move as much as 12 feet vertically above a trail and even farther horizontally to the side of the trail. The shoulder area of a trail is dependent upon passage shape, airflow and the number of cavers traveling that trail. Perhaps it would be better to not use the term "shoulder area" or to define it as the area subject to impacts from airborne lint, dust and fine sediments rather than defining it as a strict two feet on either side of the off-trail path. (SA, AA)

The terms "travel corridor" and "shoulder" will be redefined and used accordingly throughout the document. The term "shoulder" will be replaced with "monitoring zone." The "travel corridor" is the trail itself, plus an adjacent monitoring zone, along each side of the trail. The trail itself will be no more than two feet wide, and the monitoring zones will also be two feet wide (so they can be accessed without stepping from the trail).

Except at designated rest stops and during initial exploration, there should be no travel beyond the established trail. Exceptions can be made by the Cave Specialist if there is a justifiable need, including trips for management and research purposes.

Impact monitoring will be done within the adjacent "monitoring zones." Although impact will always extend beyond the trail and monitoring zones, the monitoring zones will receive more

impact than the rest of the passage. They will be monitored to ensure the rest of the passage receives even less impact, and never reaches a point of impairment.

Comment 19

Page 27- paragraph 6

Is there a difference between "off-tape" leaders and "exploration" leaders? The first two sentences makes it sound like there is a difference, since it states that "off-tape" leaders have to obtain 100 hours in the cave, but exploration leaders must have 100 hours on exploration trips. If this is the case, then you have three types of leaders, not two as is stated. (MJO)

There are only two types of trip leaders: those who can only lead only on taped trails, and those who have enough experience to lead trips beyond the taped trails. Off-tape trip leaders may lead exploration trips, regardless of their exploration experience, as long as they have a team that is qualified to conduct each function of survey and inventory properly. They may also lead recreation and orientation trips without prior experience on the route.

The revised paragraph is incorporated into the EA via these errata as follows:

Off-tape trip leaders would be required to spend 100 hours on caving trips in Jewel Cave prior to taking the trip leader training. Time spent sleeping at camp would not count as qualifying hours. To lead an overnight camp trip, the Off-tape trip leader would be required to participate in at least three prior camp trips. The Cave Management Specialist or designee would approve this trip leader. Leadership skills cannot be determined by just a number of hours of cave experience, hence the need for a training program. Trip leaders would be required to stay actively involved in exploration at Jewel Cave.

Comment 20

Page 27 paragraph 6 states "Trip leaders would be required to stay actively involved in exploration at Jewel Cave and take an annual refresher class to maintain their certification as a trip leader."

I think that requiring trip leaders to take an annual refresher class is unnecessary. Although very little will change from year to year, reviewing current policy does make sense. Possible solutions are communicate policy changes in a conversation with the Cave Specialist, create an annual newsletter or email list where trip leaders can be informed of any policy changes or other information that will help them to be effective trip leaders, maintain a policy and procedure changes log showing changes as they occur so one can quickly learn of these changes.

Trip leaders for Jewel Cave come from all parts of the United States and requiring everyone to take an annual refresher will exclude or reduce the number of qualified trip leaders unnecessarily. (SA, DL, AA, D/NA,)

The Monument has determined that, because of the required 100 hours of experience in Jewel Cave, the annual refresher will not be required. The quoted sentence is deleted from the EA via these errata.

Comment 21

Page 27 paragraph 7 concerning maintaining trip leader status states that "Off-tape trip leaders would be required to lead or participate in at least three off-trail trips per calendar year to maintain their trip leader status. For camp trips, each survey day counts as an individual trip." Annual participation in three off trail trips to maintain off trail trip leader status is unnecessarily restrictive and burdensome. The extensive frequency of specific Jewel Cave experience requirements creates a limited pool of qualified leaders and excludes many with the appropriate skills and knowledge who do not have the time or geographic proximity to make frequent trips into the Cave. Many camp trips do only two days of survey with an initial long day and a second shorter day. The requirements for maintaining trip leader status should be either three day trips or one camp trip. (SA, DL, MS)

The Monument will modify the requirement to "either two one-day trips or one camp trip." Trip leaders will be notified of policy changes when they occur.

Comment 22

Applicants for On-Trail [sic] trip leaders should have an opportunity to qualify for such status without having to participate on three off-trail trips and three trips on the requested route. This requirement is overly restrictive and will make it very difficult for a reasonable number of trip leaders to become qualified. Taped trails and detailed maps should be sufficient for experienced cavers to find their way through the on-trail routes. Applying cavers could provide details of previous experience and other trip leader positions already granted. (DL, RJR)

The On-Tape trip leaders must go on that route at least three times, and demonstrate their competence in leading the route. This provides a quicker option to begin leading a single route (as little as nine hours). It counts toward the 100 hours experience required to become an off-tape trip leader, but is not a requirement.

Comment 23

On page 27, paragraph 6, the plan states: "Generally, off-tape trip leaders would be required to spend 100 hours on caving trips in Jewel Cave prior to taking the trip leader training. Exploration trip leaders would need 100 hours of exploration experience, acquiring on-the-job experience in exploring and mapping to Jewel Cave standards."

The requirement of 100 hours of off-trail experience prior to taking trip leader training is exclusionary and excessive and appears unreasonable for the average caver. This restricts the potential pool of applicants to a select few individuals. Someone who is working as a survey team-member at other caves where they are obtaining similar experience should be able to get "partial credit" for hours of surveying/exploring at these other sites. There is no clarification as to what "Generally" means i.e. would there be exceptions, reductions in the number of hours, for example, for cavers with experience elsewhere? 100 hours is what? 10 day trips? 6 overnight trips? With only 45 exploration trips occurring between 2000 and 2005 many of the stated time and experience minimums and hours in Jewel Cave proposed in this document, plus the specific experience required in Jewel Cave, it would be extremely difficult for potential volunteers (or even staff) to gain the proposed hours of experience and time in Jewel Cave in order to qualify as a trip leader. (DL, RJR, RH, DN/A)

The intent of this policy is to increase access while minimizing impacts. To that end, the 100 hours provides hands-on experience with Jewel Cave, its staff, and procedures. It refers to the total number of hours caving in Jewel Cave (excluding sleep time on overnight trips), regardless of how it is distributed. The word, "generally," has been omitted from the EA via these errata.

Comment 24

Page 27: "On-tape trip leaders would be qualified to lead trips on taped routes within Jewel Cave. They would be required to take a basic two-hour class that would be offered by park staff at least annually." and "Off-tape trip leaders would be qualified to lead trips both on and off the taped routes in Jewel Cave. They would be required to have six additional hours of specialized training that would be offered by park staff at least annually."

As worded, these allow such a class to be offered ONLY annually, which severely limits the persons who could take it. I suggest increasing the frequency to "at least quarterly". (DN/A)

As worded, it would be offered at least annually. Additional training would be scheduled as needed, at times suitable for the greatest number of interested cavers.

Comment 25

The "Alternative B - NPS Preferred Alternative" starting on page 27, is very restrictive. The requirements for becoming a trip leader and maintaining trip leader status would be extremely difficult to achieve from a time perspective, especially for those of us who live in nearby states. If the goal of this policy is to discourage volunteer cavers from being involved in projects at Jewel Cave, then this plan will certainly accomplish that objective. (MM)

See responses to comments 20, 21, 22, 23 and 24.

Comment 26

Page 40, paragraph 3 has numerous errors in the scientific and common names of bats. "Silverhaired" should be "Silver-haired". "Northern long-eared myotis" should be "Northern myotis". "fringe tailed myotis" should be "Fringed myotis". "Corynorhinu townsendii" should be "Corynorhinus townsendii". In sentence two Silver-haired and Hoary bats should be capitalized. (SA)

The typographical errors regarding Silver-haired bats, Corynorhinus townsendii, and Hoary bats are incorporated into the EA via these errata.

Myotis septentrionalis has many common names, including both Northern long-eared myotis and Northern myotis. Northern long-eared myotis is considered to be an acceptable common name for this species. Fringed myotis is the appropriate common name for Myotis thysanodes; however, the subspecies present at Jewel Cave is Myotis thysanodes pahasapensis, and is commonly referred to as Black Hills fringe-tailed myotis or Fringe-tailed myotis. The subspecies name was mistakenly omitted from this paragraph and is incorporated into the EA via these errata.

Comment 27

Page 41, paragraph 3, sentence 3: I suggest changing the word "cat" to "feral cat" in order to avoid any confusion with native cats such as Mountain Lions and Bobcats. (SA)

Agreed. The suggested change is incorporated into the EA via these errata.

Comment 28

Page 72, Consultation and Coordination does not mention the draft release of the JECA Cave Management Plan in 2004 and the written responses received by JECA concerning that draft. (SA)

May 3, 2004 – a portion of the plan was submitted for internal review to the technical review team, Jewel Cave division chiefs, and USFS.

Comment 29

Page 76: The map showing the close-in versus peripheral cave areas shows the entire area beyond High Water to be defined as close-in. I recommend changing the area beyond High Water to peripheral due to the long travel times required to reach this area. (SA)

Agreed. The suggested change is incorporated into the EA via these errata.

Comment 30

Appendix A, number 4 requires that hard hats be worn at all times. Suggest changing this to "Hard Hats should be worn whenever possible". Certain squeezes are not negotiable without removing a hard hat and cave camping requires removing hard hats for sleep periods. (SA)

Agreed. The suggested change is incorporated into the EA via these errata.

Comment 31

Appendix C, Introduction states that "...on average, it would take at least five single-day trips to accomplish the same amount of surveying done on one four-day camp trip."

This statement is incorrect if you assume a single team on day trips and a single team on camp trips. A single team on a camp trip can get a partial day of survey en route to camp and then two full days from camp. This works out to about the same amount of survey as 2.5 day trips.

Perhaps the mistake was made in comparing five single team day trips and one double team camp trip? (SA)

Based on an idealized comparison of three people surveying one hour beyond camp on a day trip, versus a 4-day camp trip, the camp trip would be four times more effective than the day trip.

Comment 32

Appendix G states that "Because of the high integrity of the data, Jewel Cave has never needed a resurvey."

Perhaps it would be more accurate to state that Jewel Cave has never needed a complete resurvey. Individual surveys have been redone to fix loop errors. (SA)

Jewel Cave has never needed a complete resurvey. The word complete is added to the above quoted sentence in the EA via these errata.

Comment 33

Appendix G, Backsights states that "Normally, only foresights are used to process the survey data, to ensure the consistency of a single compass reader."

I recommend that backsights be entered into the computer as well for the following reasons. Entering backsights allows for the survey software to check that both readings agree within two degrees and is a great way of locating errors made in the cave in addition to data entry errors. In addition if two sets of instruments are used, entering the backsight information will average the errors between the two sets reducing bias due to instrument errors. In short using backsights and foresights to process the data will improve the data. (SA)

Both foresights and backsights will be recorded in field notes and in the database. While averaging backsights and foresights is one philosophy of reducing errors, not all studies agree on this matter. Under some circumstances, averaging both will dilute the quality of the measurement. This is a procedural concern that will be adjusted as new studies/equipment become available.

Comment 34

Appendix G, Backsights states that "When backsights are used, the uncorrected values should be recorded."

I find that recording corrected backsight values reduces survey blunders. When the backsight instrument reader reads the corrected values it reduces the calculations that the sketcher performs. Since the sketcher has the most challenging job during a cave survey, anything that can be done to reduce the complexity of the sketching task will reduce the number of blunders made. I recommend that the survey standards allow for persons to choose their preference as to corrected or uncorrected backsight recording. (SA)

Agreed. The suggested change is incorporated into the EA via these errata.

Comment 35

Appendix G – Sketching does not define the minimum amount of detail desired in sketches. I recommend that this be defined. (SA)

At a minimum, all floor morphology with a relief greater than 5 feet will be recorded. The graphical representation of cave features will record any significant variations.

Comment 36

Appendix G – Sketching refers to cave map symbols that should be used but does not include them in the appendix. I recommend including the desired symbols in the appendix. (SA)

This will be included at a later date, prior to the first trip leader training session.

Comment 37

I have some concerns about the monitoring program established by Alternative B: The data collected by this program, and the conclusion drawn from it, will likely depend heavily on how it is implemented. Calibration of coverage percentages should be possible with an understanding of measurement error associated with different techniques, particularly at the low end of coverage. The placement of the Petri dishes at monitoring points will probably have a major influence on data collected. Impact should attenuate rapidly with increasing distance from trails and other 'use areas'. Thus shifting the placement of a dish by inches or feet could exert strong control over the rate of dust accumulation in that dish. The idea of stopping use of part of the cave when a maximum allowable level of impact is reached and then restoring the area by management actions sounds good. However, I'm not sure what practical management actions might be taken to restore such areas. Cave impact does need to be monitored, and there is no perfect method for doing so. The monitoring system described is a move in the right direction, but I think flexibility and adaptability will be important in implementing it. (CB)

The Monument will consult with subject matter experts to ensure a representative sampling method.

Comment 38

Appendix G- Cave Survey Data Collection Standards, Page 95: "Symbology is based on NSS Standard Cave Map Symbols, but adapted to the unique needs of the Jewel Cave system." What unique needs does Jewel Cave have that require special non-standard symbols? The cave symbols that JECA uses were developed in the 1960's independently from the rest of the caving world. Granted, there are no national standards that you must adhere to, but there is a non-official set of symbols that the rest of the entire world uses. This simplifies things and allows cavers from anywhere to be able to interpret and use your maps. (MJO)

See response to comment 39.

Comment 39

Appendix G- Cave Survey Data Collection Standards, Page 95: "Cartographic standards are designed to meet the specific management needs of Jewel Cave National Monument." This statement is woefully inaccurate and terribly misleading. The cartographic standards of JECA were designed by two volunteer cavers in the 1960's, with no regard to the management needs of the monument, and were based on the technology and expertise available at that time. This plan and associated EA are the first time that the monument has designated needs and developed management strategies. In today's world of cave mapping expertise, computer-aided cartography, and GIS, it seems a shame that the monument is deciding to stick with standards developed in a bygone era. (MJO)

The two volunteers (Herb and Jan Conn) learned cave surveying from a caver who used the NSS "standard" of that time. However, Herb found that it was inadequate for representing the third dimension on a two-dimensional map, and was not even self-consistent. He modified it by using line types to represent stratigraphic levels and floor morphology – something even the current NSS standards cannot do.

While the NSS standards have evolved to include more detail, and have been widely adopted, they remain incompatible with the 140 miles of passages already mapped. Whenever new passages mapped by current NSS standards pass over or under passages previously mapped with the Jewel Cave standard, the combination results in a logically impossible and irresolvable representation of the cave.

Trip leaders will be trained to read Jewel Cave maps. With over 140 miles already mapped, they will need these skills to navigate to any of the unexplored areas.

The Jewel Cave Standards require consistent use of the “floor morphology” model, but will be augmented to include compatible NSS symbols for representing specific cave features to avoid confusion and ensure the integrity of the map – where newly mapped passages cross over those that have been previously mapped.

Comment 40

Appendix G- Cave Survey Data Collection Standards, Page 96: "If no agreement can be reached, the reading from the station that was easiest to read from should be used."

Do not confuse the ease of reading an instrument with the accuracy of which it is being read. You are simply providing an easy out, so that cavers do not have to spend time dealing with a bad shot. The whole point of doing back sights is to catch blunders while you are still in the cave and have the ability to correct them. Why allow them to discover a blunder and to simply move on, injecting a blunder into the data set? There are many things that you can do to help correct the situation. Have another person read the instruments, move the station to allow a better reading, ensure that equipment (lights, packs, etc) is not too close to the compass, or have the reader obtain a better angle/position. (MJO)

Instead of making a determination by the “ease” of reading, every effort will be made to remove problematic circumstances. This would include re-setting the shot, if it is found to be poorly positioned. These changes are incorporated into the EA via these errata.

Comment 41

Appendix G- Cave Survey Data Collection Standards, Page 97: "Stations must be marked with a prominent bull's eye (currently with a permanent marker) on bedrock, a loose rock, or rock cairn."

The monument needs to develop a better system for marking survey station than the current method of writing on a rock with a sharpie. Stations set with this technique are extremely difficult to find. Writing on a small rock with a black marker in a cave filled with black sediment does not work. Flagging tape and Mylar tabs are two proven methods used by many other parks. (MJO)

This has already been addressed in the plan. No one method has proven to be best. However, the Monument recognizes that using black marker is not ideal, and will actively pursue new techniques.

Comment 42

Appendix J- Photography: "If the photography is done with park equipment, the photographs belong to the park."

To whom the equipment belongs to does not determine who the photo belongs to. The photographer is always the person that the photo belongs to, unless they have waived their ownership. If the monument is sending park-owned cameras in with survey teams, you simply need to have a disclaimer within the volunteer agreement that states the park owns the photographs. When the volunteer signs this, the photos now belong to the monument, as the photographer has waived their ownership rights. (MJO)

The text in the EA is revised via these errata to say "Photographs belong to the photographer unless waived in the volunteer agreement."

Comment 43

Page 30 Exotic Plant Control

I would want to see additional research done before leaping to some of the conclusions that the plan arrives at - especially those involving the likelihood of the transport of chemicals or herbicides/pesticides to the cave environment. To justify the end means of using pesticides within the monument, you created zones that are based upon little reasoning, without taking many vital factors into account (e.g. chemical half-life). If an herbicide is used to treat an area above the cave in a supposedly "safe" area, and then an unusually heavy rain event occurs, it is difficult to predict what might happen with surface and subsurface runoff. I encourage more thought about worst-case scenarios before getting too involved with pesticides or herbicides above the cave. Your reasoning for using pesticides is based on the fact that the monument's current plant crew cannot get to all the sites within a given summer. Why not utilize the region's EPMT crew to assist with mechanical methods, and/or acquire additional funding to hire more seasonal help, or the SCA program. (MJO, JN)

The "Minor Risk Treatment Zone" seems to be above the Minnelusa Formation as if it is some sort of barrier to infiltration to the cave. While the Minnelusa forms a caprock above the cave, it is really only the basal shale members that do so. The entire sandstone unit above the shale forms a zone of recharge for the perched Minnelusa aquifers. These aquifers discharge onto the limestone in discreet springs. Several places on the Monument where this happens include Prairie Dog Spring, Jewel Cave Spring, and Chokecherry Spring. In these places the water flows a short distance on the surface and then sinks into the Madison Formation directly above known cave passages. I don't believe the hydrology of JECA has been studied to the point where we can definitively say what a Minor Risk is and what is not. (AA)

Mechanical and biological control methods will be used first, to maintain/control non-native plants. If these methods do not give the needed results, pesticide treatment will be considered. While there is some risk in using pesticides, they would be used if needed to reduce the impact of exotic vegetation on a karst landscape. This is an important issue because a change in vegetation will ultimately result in changed water distribution and chemistry, which will also adversely impact the cave.

Designating the use of pesticides as a Minor Risk involves more than just geological and hydrological considerations. For example, chemicals with high specificity, low leaching potential, and low persistence would be preferred, and pesticides would be hand sprayed on individual plants. Broadcast spraying of pesticides will not be permitted anywhere within the Monument.

To mitigate impacts from the application of pesticides, established Best Management Practices (BMPs) will be followed closely. These include the use of pesticides with a low potential toxicity and those that are easily degraded by soil microbes; avoiding application near surface waters; and avoiding “No-Pesticide Treatment Zones,” which include areas above known cave drip sites, areas within the watersheds which could potentially drain into cave and karst resources, and areas where permeable rock layers are uncapped by a layer of sandstone that is impermeable enough to preclude any water from dripping into 98% of the known cave passages.

While it is possible for surface water to infiltrate to the upper surface of the sandstone and then move laterally to a point where it could seep into the cave, that water is first subject to an annual evapotranspiration rate exceeding 95%, effectively lowering flow rates and lengthening travel times, which in turn allows more time for degradation of the pesticide. The springs mentioned in the comments all occur within localized surface drainages, do not sink directly into the Madison Limestone and are not directly above known cave passages.

Finally, the park will develop programs to monitor water quality in the cave, and will re-evaluate the pesticide treatment zones if chemicals used by the park were detected in cave drip water.

Taken together, all these factors contribute to minimizing the risk of using pesticides for control of exotic vegetation.

Comment 44

Size limits of 4 on one survey trip, two more on a parallel trip, do not seem based on any reason and are better as guidelines. Certain areas may experience less environmental degradation with smaller trip groups but these can be detailed if restrictions are needed there. There are many areas of the cave where trips of 5 would be appropriate for survey and exploration work, especially for training personnel. Alternately trips of four with 3 experienced personnel and a student working under one of the others with the requisite skills can provide an adequate training. Requiring these skills be gained elsewhere seems to imply that Jewel is somehow unsuitable for training beyond formal practice sessions, and that is clearly not the case. It also implies that Jewel Cave requires some consideration above and beyond that afforded to other similar caves without stating the reason for this restriction. (DL)

Experience has shown that the optimum number for a survey trip is 3-4. This plan allows for teams of two under well-defined circumstances. Allowing four people provides more opportunity. Five is too many and typically results in one member not having enough work and becoming cold because of inactivity. Groups of five or six can be accommodated if they split into survey teams of 3 and 2, 4 and 2, or 3 and 3.

Also see response to comment 55.

Comment 45

Limiting passage enlargement to simple hand tools seems unneeded; there are other good, proven ways to enlarge passages that would be appropriate. The "accomplished during a single trip" proposed requirement should be a guideline, or perhaps not even a consideration. Allowing explorers to modify passage in a given area can be specific to a single action or site; time limits do not appear appropriate, or needed. Making the Cave Specialist the only person authorized to approve enlargement seems unnecessarily restrictive. At a minimum the superintendent should be empowered to identify others with that authority. (DL)

The policy allows explorers to do minor enlargement at the time of discovery. Any work that goes beyond minor alteration would require the approval of the Superintendent, based on the recommendation of the Cave Specialist.

Comment 46

Prohibiting drinking from all pools seems overly restrictive if the intent is to protect microorganisms. The size of the water body and method of water collection should be considered. This should be a guideline, perhaps limiting specific or all currently known water bodies if necessary. Although there are no substantial water bodies in the known part of the cave, a policy based on the assumption that there will not be larger water bodies, or ones that are not particularly susceptible to microorganism contamination seems inappropriate. (DL)

There are very few pools in Jewel Cave and all sources of drinking water have been collected from drip sites. Intercepting water as it falls from the ceiling virtually eliminates the possibility of contaminating the cave water. The policy is based on known conditions in over 140 miles of passages. Though highly unlikely, differing circumstances will be handled on a case-by-case basis.

Comment 47

Immediate reporting of a new cave to the cave specialist seems unnecessary. One would expect reporting to any cave resource management staff person would be sufficient, and a report within some reasonable period, say a week or a month seems quite adequate, chances are the cave has been there for a very long time. The discovering party should have the option to be included in the initial assessment and survey, if qualified and schedules can be arranged to permit participation. (DL)

The Cave Specialist is the contact for cave activities. The Monument should always be notified immediately if new discoveries are made. It would make arrangements for an initial assessment and survey, which could include members of the discovering party when feasible and appropriate.

Comment 48

Requiring blanket removal of all water collection devices not in current use may impede exploration or rescue in certain areas especially since no water collection is allowed except from

dripping sources. Other factors beyond current use should be applied. These are not plan policy items but rather day to day management decisions. (DL)

When unattended, water collectors deteriorate and/or become plugged with a slime mold. When fresh water is not continually circulated through the collector, there is a risk of stagnation. The policy will eliminate the use of potentially unsafe drinking water, and also partially restore natural hydrologic patterns.

Comment 49

It is not clear as to what the policy will be regarding recreational caving trips, other than the fact that the Preferred Alternative at least provides for several more recreational routes. Apparently only one trip outside of the spelunking trip, the Hub Loop, is currently allowed and only to Paha Sapa Grotto. More trips by appropriately experienced cavers should be allowed on a regular basis. (MS)

In the last 20 years, the Hub Loop and Spelunking Route have been made available to NSS groups and functions: The Paha Sapa Grotto, Rocky Mountain Regional, and NSS pre- and post-convention trips. These have been scheduled by the Monument. The preferred alternative will allow recreation on five additional routes, can be led by anyone qualified to lead the trip, and can be scheduled for the group's convenience. Participants do not need to be affiliated with any particular group or event.

Comment 50

The provision that equipment packs be no larger than a "Lost Creek Monster TAG Pack" seems completely esoteric. How do you determine what size that is? I would think that it would be more practical to state size limits in maximum dimensions or volume. (MS)

The Monster Tag Pack has been used extensively in Jewel Cave and is a good point of reference, understood by most cavers. Its dimensions are 22" x 10" x 5½." The dimensions are incorporated into the EA via these errata in parenthesis, after the reference to the Monster Tag Pack.

Comment 51

Use of bleach to kill algae (p19) is not the best method, as it introduces a chlorine residue into the cave environment. A better alternative is hydrogen peroxide. See Hildreth-Werker and Werker (2006) Cave Conservation and Restoration, NSS Publication. (MS)

The referenced article was written by Diana Northup, who suggested that hydrogen peroxide might be a viable alternative, but that comparison tests have given mixed results.

Comment 52

The management plan wishes to provide for appropriate science-based management. Are there specific provisions for scientific research and input from scientists to do this? There are specific provisions for exploration permits but are there provisions for scientific access to the cave? There should be provisions for scientific sampling with the proper permit. (MS)

This has been addressed in the plan.

Research will be conducted with “well-trained trip leaders who have an understanding of management needs and the ability to lead other cavers effectively during normal and emergency circumstances. All research is evaluated against applicable policies and regulations via the Research Permitting and Reporting System (RPRS), reviewed, and permits are issued on a case-by-case basis. Priority is given to those projects likely to contribute to the management and understanding of Monument resources. Projects that involve destructive sampling are discouraged unless they clearly benefit management needs and the benefits overwhelmingly outweigh the impacts. In compliance with 36CFR, sampling may only be done in Jewel Cave if no other cave would meet the specific goals of the research.”

Research trips will be conducted “on an as-needed basis to areas of concern using trip leaders who are qualified to lead to that area. The trips would be scheduled by the cave resource management staff.”

Comment 53

The plan is attempting to develop "fair and equitable" policies for rationing orientation and recreation trips in the cave. I strongly feel that the plan should explicitly state that as an objective for exploration trips as well. This does not mean that everyone should get to lead trips whenever or wherever they like. It just means that interested and qualified individuals would all have equal access to whatever system is deemed best for the cave. Perhaps it is best to assign permit approval duties to a disinterested third party, such as the superintendent. (JN)

The stated objective is to “accommodate qualified individuals who wish to be involved in exploration.” The words “fair and equitable” are added to the statement and incorporated into the EA via these errata. Currently, all trips are recommended by the Cave Specialist and approved by the Superintendent. Ultimately, this will be delegated to the Cave Specialist, except when that person plans his or her own trips. In that situation, the Superintendent will approve/disapprove the trip.

Comment 54

Ultimately, it needs to be realized, and perhaps explicitly mentioned, that one of Jewel Cave's greatest resources is its wealth of unexplored territory. Towards that end, in the second significance statement on page 3, I would amend the statement to read "...providing unique opportunities for scientific study and increasingly rare opportunities for genuine exploration and discovery." (JN)

Scientific studies have shown that most of Jewel Cave remains undiscovered. Because the Monument recognizes the inherent value of exploring new territory, this plan has been written to provide more access those wishing to explore the cave, and more flexibility in their choosing when and where to explore.

The statement is amended and incorporated into the EA via these errata as follows: “Jewel Cave is a nearly pristine and largely unexplored frontier providing unique opportunities for exploration, discovery, and scientific study.”

Comment 55

Pg 30, Guidelines for Off-Trail Travel Exploration Trips: "...no more than one caver without prior survey experience...this caver would be allowed to assist...but could not sketch, read instruments, or do inventory. Sketching or instrument-reading skills could be gained by participating in practice sessions on established routes."

First of all, I agree in only having one inexperienced person per team. But, with only one per team being mentored by experienced people, I do not see any harm in letting a new surveyor read instruments or record inventory. Instrument readings are always confirmed by backsight and as such, could not be compromised by an inexperienced surveyor. JECA inventory must be learned on the job by its very nature and is almost always a team effort anyway. The above provision serves to limit trip leader authority and makes it harder for trip leaders to assemble teams and achieve in-cave objectives. In reality, practice sessions to gain skills are difficult to organize, are time consuming, and almost never actually happen. (AA)

A survey team may include members without prior survey experience and they may learn to read instruments or record inventory data under the guidance of a person who already has that experience. This provision is incorporated into the EA via these errata. Only sketchers approved by the cave management staff may sketch. To become approved, a sketcher must meet the requirements on the sketcher evaluation form in Appendix G. It is the trip leader's responsibility to ensure that all survey data meets park standards.

Comment 56

Pg 42, Microclimate: "Because the relative humidity is so high, evaporation occurs very slowly unless enhanced by heat input from people or electric lights, or by drier air entering through natural and artificial entrances."

Another way that evaporation can be enhanced in constant humidity is by airflow. This occurs in constrictions where air must speed up, evidenced by evaporative speleothems such as popcorn and frostwork. This evaporation occurs naturally without any impact from artificial sources. Maybe this should be added to the paragraph. (AA)

The suggested change is incorporated into the EA via these errata by adding: "Additional, localized evaporation may occur where airflow speeds up as it passes through a constriction."

Comment 57

Pg 43, Physical Cave Features: "Except near the naturally light entrance..."

The word light is a typographical error and should be replaced with lit. (AA)

Agreed. The suggested change is incorporated into the EA via these errata.

Comment 58

Pg 81, Appendix B: Cave Search and Rescue Plan: Appendix 2 Technical Specialist List and Appendix 3 Local Resources.

As a local caver with over 500 hours of Jewel Cave experience and an NPS employee who has been level 1 trained by the National Cave Rescue Commission, I am disappointed to have been left off of both of these lists. As I would almost certainly be called to help in case of a rescue, a

job none of us would want to do, it would at least be nice to be officially recognized in the plan as a resource. (AA)

This comment is apparently based on an earlier draft of the plan. The commenter is listed on the Local Resources List in the draft released for public review. Omission of his name from the Technical Specialist list was an oversight and will be corrected.

Comment 59

Pg 89, Appendix G Cave Survey Standards and Cartographic Guidelines: "...cross sections will be made at every survey station..."

This is an unreasonable thing to ask of sketchers. A cross-section at every station will serve to slow down surveys and clutter sketch books. Considering the low level of sketch detail that JECA has traditionally required, I wonder what is the motivation for this guideline. Cross-sections are nice but are not necessary at every station. I can't imagine anyone who currently sketches at JECA (including Park staff) actually doing this. (AA)

Public comments have consistently recommended more detail in the sketch. Most have focused on floor detail, an artistic rendition of information collected via the cave feature inventory that graphically identifies its correct location within the passage.

In comparison, cross-sections provide a different kind of detail: a quantifiable approximation of the passage shape – useful for understanding the geology paleohydrology of the cave. By providing basic information on the third dimension of the cave, it is also useful in implementing 3D modeling, and working with microclimate and volumetric airflow studies.

The recording of cross-sections will take a little more time, but the data collected is well worth the time. The Monument will not require separate sketches at adjacent stations where the cross-sections would be nearly identical.

LIST OF COMMENTERS

1. Paul Burger (PB)
2. Stan Allison (SA)
3. Carl Bern (CB)
4. Marc J. Ohms (MJO)
5. D. Lester (DL)
6. Michael Spilde (MS)
7. Richard J. Rhinehart (RJR)
8. Roger Harris (RH)
9. Jim Nepstad (JN)
10. Larry Shaffer (LS)
11. Marty Morey (MM)
12. Dave N/A (DN/A)
13. Anonymous (Anon)
14. Andy Armstrong (AA)