

White-Nose Syndrome Adaptive Management Strategy
Final Environmental Assessment
DOI-BLM-CO-931-2014-0001-EA

CHAPTER 1—INTRODUCTION

1.1—Background

White-Nose Syndrome (WNS) is a fungal disease that has killed at least 5.7 million bats in the eastern third of North America during the past 6 years, and continues to spread south and west. The fungus that causes WNS, *Geomyces destructans*, has been renamed *Pseudogymnoascus destructans* (Pd). Cave and abandoned mine hibernating bats are especially vulnerable because caves and underground mines provide the cool, moist conditions favorable for the fungus to thrive. The Bureau of Land Management (BLM) administers numerous caves and abandoned mines in Colorado, many of which are used by bats for hibernation or roosting.

Scientific data collected to date indicates that transmission of WNS is occurring bat-to-bat and cave/mine-to-bat. Scientists also suspect transmission of WNS may be facilitated by human activity in caves where bats hibernate because of the geographically discontinuous spread of the syndrome. People may be inadvertently transporting fungal spores from cave to cave, as fungal spores have been detected on gear exposed to affected sites.

On August 19, 2010, the BLM released the national White-Nose Syndrome Interim Response Strategy (Washington Office Instruction Memorandum No. 2010-181). The strategy directs BLM offices to conduct outreach, emphasize ongoing inventory efforts, consider restricting access to caves and abandoned mines, implement containment and decontamination procedures, participate in interagency groups and recommend monitoring sites.

1.2—Purpose and Need

The purpose and need of the White-Nose Syndrome Adaptive Management Strategy is to enable the BLM and its partners to work collaboratively to reduce the potential of human-assisted introduction of Pd/WNS in BLM-administered caves and abandoned mines in Colorado and to respond rapidly and effectively in the event that Pd/WNS is detected in Colorado.

1.3—Decision to be Made

The BLM will decide whether to implement an adaptive management strategy, and if so, to determine the procedures for managing access to BLM-administered caves and abandoned mines that support bat populations.

1.4—Area of Consideration

The area considered in this Environmental Assessment (EA) includes all BLM-administered caves and abandoned mines in Colorado and the areas immediately surrounding their points of entry or access.

1.5—Conformance with Land Use Plan

The Proposed Action conforms to all BLM Colorado Resource Management Plans (RMPs), as amended. Each BLM field office RMP incorporates the current law, regulation and policy regarding the management of all resources on public lands.

1.6—Relationship to Statutes, Regulations, Policies, and Other Plans

- The Federal Land Policy and Management Act of 1976, as amended, Public Law (PL) 94-579 (43 United States Code (U.S.C.) 1701 *et seq.*).
- The Federal Cave Resources Protection Act of 1988 (FCRPA), as amended, PL 100-691(16 U.S.C. 4301 *et seq.*).
- BLM Manual 8380, Cave and Karst Resources Management.
- Title 43 Code of Federal Regulations (C.F.R.), Part 37 – Cave Management.
- 43 C.F.R. § 2392.26 (all), Permits for Recreation on Public Lands.
- Visitor Services, Closure and Restriction Orders - 43 Code of Federal Regulations (C.F.R.), Section 8364.1.
- BLM Washington Office Instruction Memorandum No. 2010-181, “White-nose Syndrome”, 8/19/2010.
- A National Plan for Assisting States, Federal Agencies, and Tribes in Managing White-Nose Syndrome in Bats, United States Fish and Wildlife Service, May 2011.

1.7—Public Participation and Coordination with Other Agencies

The BLM offered a 30-day public scoping period from March 28, 2013 to April 26, 2013. Throughout the scoping period, the BLM sought public input on issues and management actions that should be considered in the EA. The BLM issued a press release announcing the scoping period, and sent letters requesting comments to relevant government agencies, elected officials, non-governmental organizations, recreational caving groups and industry associations.

The BLM received scoping comments from the United States Forest Service (USFS), Colorado Parks and Wildlife (CPW), the Colorado Cave Survey and individual members of the caving community. Letters received during the scoping period generally expressed support for an adaptive management approach, and provided specific comments on management actions that the BLM should pursue. The BLM considered all scoping comments received, and incorporated many actions suggested by commenters into the White-Nose Syndrome Adaptive Management Strategy and EA. In addition to the comments received, the BLM also met in-person with those groups who provided written comments to get additional input on the Proposed Action.

The BLM provided the public a 30-day period from April 21, 2014 to May 22, 2014 to comment on the EA. The BLM received nine comment letters from cavers in Colorado, the National Speleological Society, the Center for Biological Diversity, Bat Conservation International and CPW. The final EA reflects minor language changes based on these comments.

CHAPTER 2—DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1—No Action Alternative

Under the No Action Alternative, BLM Colorado would continue to address and manage the potential for occurrence of Pd/WNS in keeping with current law, regulation, and policy outlined in BLM Washington Office Instruction Memorandum (IM) No. 2010-181, “White-nose Syndrome.” This IM provides guidance on how to prevent and respond to the spread of Pd and WNS and transmits the BLM-WNS Interim Response Strategy.

Under the No Action Alternative, the BLM would continue implementing the actions outlined in the BLM-WNS Interim Response Strategy, which includes:

- Coordinating outreach with appropriate internal and external stakeholders.
- Identifying caves/abandoned mines with important bat resources.
- Emphasizing the inventory of bat presence during abandoned mine lands (AML) surveys.
- Assess need for administrative or physical closures.
- Identifying WNS surveillance locations.
- Adhering to the current containment and decontamination protocols, and applicable addendums. The most current USFWS decontamination protocol is available at www.whitenosesyndrome.org.
- Participating in and support WNS research.

The BLM-WNS Interim Response Strategy is available in its entirety at:

http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2010.Par.10218.File.dat/IM2010-181_att1.pdf.

Management of Abandoned Mine Lands – The BLM will continue to discourage the public from entering open abandoned mines. The BLM is an active proponent of the “Stay Out-Stay Alive” campaign, which was launched in 1999 by the Mine Safety and Health Administration. This is a collaborative effort between more than 70 agencies and organizations. The campaign warns outdoor enthusiasts of the dangers of exploring active and abandoned mines. If the BLM hires contractors to decommission, close by placing bat gates, and/or reclaim AMLs, the contractors would follow current decontamination protocols as appropriate.

The BLM Colorado River Valley Field Office would continue to implement the LaSunder Cave Management Plan.

2.2 - ALTERNATIVE 2 – PROPOSED ACTION

The Proposed Action would apply to all known and unknown BLM caves in Colorado and all cave management plans.

The Proposed Action uses an adaptive approach to manage caves and AML to respond to the dynamic nature of Pd/WNS introduction and spread. This alternative consists of two parts:

- 1) Efforts to reduce the likelihood of human-caused introduction of Pd/WNS into biologically important BLM-administered caves and abandoned mines.

- 2) A response plan in the event that Pd/WNS is detected/confirmed within 100 miles of BLM Colorado-administered lands will implement needed closures in important bat habitats within the state while collaborating with key stakeholders such as CPW, Colorado Cave Survey and local Colorado cave grottos.

Part 1: Efforts to reduce the likelihood of human-caused introduction of Pd/WNS into BLM administered caves and abandoned mines;

1. Actions included in the No Action Alternative will continue to be implemented.
2. All caves will remain open to the public unless previously closed through a land use management plan decision.
3. All people entering any cave or abandoned mine on BLM lands will be required to follow the latest U.S. Fish and Wildlife Service (USFWS) decontamination protocols (www.whitenosesyndrome.org). The State of Colorado has developed an addendum to the USFWS decontamination protocol that states decontamination does not need to occur at sites that are less than 10 miles from the cave feature or site where decontamination of gear being used was last conducted. The BLM will adhere to this addendum for decontamination protocols on BLM lands (see Appendix 1).
4. Caving gear and clothing from caves or sites within states or other countries where Pd/WNS has been documented is prohibited in accordance with WNS Working Group guidelines (www.whitenosesyndrome.org).
5. Work closely with caving groups, other interested stakeholders and CPW to identify “biologically important” caves and abandoned mines for bat resources. In order to identify “biologically-important” caves and abandoned mines, priorities for the BLM include sharing of data (such as cave/mine locations, prior biological surveys, amount of human use and recent observations) via a BLM-administered voluntary online reporting system and collaboration to accomplish needed survey work. Without this cooperation, the BLM will have to make management determinations using limited information.

Table 1 describes the definition of biologically important bat sites. These criteria are based on New Mexico’s WNS state response plan and the Colorado Bat Working Group’s draft definition for meeting this criteria. The BLM has modified the definitions that were in the draft document submitted by the Colorado Bat Working Group for this analysis. This revised definition is more applicable on BLM lands considering the existing lack of population data and the potential wide-spread effects of WNS if it were found in Colorado.

Table 1. Criteria of caves that are considered biologically important bat sites. If either Criterion is met the site will be considered biologically important.

Criterion A: A biologically important bat roost includes any hibernaculum, maternity roost, transient roost, bachelor colonial or day roost, or fall swarming sites used two or more consecutive years by bat species that are one or more of the following: gregarious roosters, hibernators, or are known to swarm in Colorado. This use can be documented by state and federal monitoring efforts.

Criterion B: Cave and mine roosting species that are either ESA-listed, or BLM Colorado state-listed sensitive species. Five bat species qualify under this criterion as BLM-designated sensitive species.

Part 2: BLM Colorado's response plan in the event that Pd/WNS is detected.

This applies if Pd/WNS is detected and confirmed on BLM-administered lands or other federal (Forest Service, Park Service, USFWS Refuges), state or private lands in Colorado within the buffer distance. It also applies if Pd/WNS is detected in an adjacent state near BLM-administered lands in Colorado within the buffer distance.

1. All caves and abandoned mines that have been identified as biologically important to bats will be temporarily closed through a *Federal Register* notice within 100 miles of the confirmed detection. The BLM will continue to work with CPW in implementing their WNS response plan (<http://wildlife.state.co.us/SiteCollectionDocuments/DOW/Research/WildlifeHealth/WNSResponsePlan.pdf>), which increases surveillance and monitoring within a 10-mile radius of the initial detection.
2. All closures would be in effect for one calendar year. At the end of this time, the BLM would evaluate the need to continue this closure or re-open the resource. The public will be notified of closures through *Federal Register* notices and other relevant media. Other actions may include signage or structures at BLM field offices, trailheads, closed locations or areas and BLM webpages.
3. Exemptions to the closure will include:
 - Search and rescue efforts;
 - BLM-approved research/survey/monitoring efforts; and
 - Tribal ceremonies, rituals, or other culturally-important events.

All proposals for cave/mine research, survey, or monitoring must be submitted in writing to and approved by the appropriate BLM field office prior to entry. This will ensure the proposed activity is beneficial to BLM resources. All closure exemptions will be required to follow decontamination protocols as outlined in this document.

4. The BLM will prioritize coordination efforts with other agencies, landowners and key stakeholders (including recreational caving advocates such as the Colorado Cave Survey and associated grottos) on identification of caves where people recreate to determine bat presence and biological importance in the areas closest to the detected and confirmed presence of Pd/WNS. This determination will be

based on the definition of biologically important sites as defined in Part 1 of the Proposed Action. Initial determinations of biological importance will be based on current data. This information, collected through collaborative efforts, will be updated through research, future monitoring results and on-line reports.

2.3—Alternatives Considered but Eliminated from Detailed Analysis

The BLM also considered an alternative that would close all BLM-administered caves in Colorado. This alternative was dismissed from detailed analysis because it is believed that Pd/WNS are primarily transmitted bat-to-bat. While there is a possibility Pd can be transported to caves by humans, there is a lack of scientific consensus regarding the probability and mechanisms of human-assisted transfer of Pd. A blanket closure of all caves and abandoned mines in Colorado is not consistent with current BLM cave management policy (BLM IM 2010-181). The BLM feels that the decontamination protocols provide effective prevention of transporting Pd. Lastly, a blanket closure would also eliminate opportunities for cave recreation and scientific research.

CHAPTER 3—AFFECTED ENVIRONMENT

3.1 Wildlife - Bats

WNS first appeared in North America in 2006 and has killed almost 6 million individual bats since it was discovered. The fungus associated with WNS, Pd, has been associated with nearly all the documented deaths. This disease has affected seven bat species and has been documented in 25 U.S. states and five Canadian provinces.

There are 19 bat species that are known to occur in Colorado (Table 2). All of these species may occur on BLM lands in Colorado and five of these species are managed as sensitive species by BLM Colorado. Thirteen of the species that occur in Colorado are known to hibernate in caves and AML within the state and could be affected if WNS spreads west to Colorado.

Analyzing and disclosing the effects of the Proposed Action to federally-listed species is necessary to comply with the Endangered Species Act of 1973 (16 U.S.C.1531 *et seq.*), as amended; BLM Manual 6840 direction for special status species management; and the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C.4321 *et seq.*), as amended. No federally-listed bat species occur in Colorado; therefore, the project effects discussed below do not result in a requirement to consult with the USFWS (Section 7, Endangered Species Act). The other federally-listed species that may occur on BLM lands are not affected by the Proposed Action and will not be carried forward for analysis.

Table 2. Bat Species Known to Occur in Colorado			
Scientific Name	Common Name	Known to hibernate in Colorado? Yes/No	BLM Colorado State Sensitive Species? Yes/No
<i>Antrozous pallidus</i>	Pallid bat	Yes	No
<i>Carynorhinus townsendii</i>	Townsend's big-eared bat	Yes	Yes
<i>Eptesicus fuscus</i>	Big brown bat	Yes	No
<i>Euderma maculatum</i>	Spotted bat	Yes	Yes
<i>Lasiurus borealis</i>	Eastern red bat	No	No
<i>Lasiurus cinereus</i>	Hoary bat	No	No
<i>Lasionycteris noctivagans</i>	Silver-haired bat	No	No
<i>Myotis ciliolabrum</i>	Western small-footed myotis	Yes	No
<i>Myotis californicus</i>	California myotis	Yes	No
<i>Myotis evotis</i>	Long-eared myotis	Yes	No
<i>Myotis lucifugus</i>	Little brown bat	Yes	No
<i>Myotis thysanodes</i>	Fringed myotis	Yes	Yes
<i>Myotis volans</i>	Long-legged myotis	Yes	No
<i>Myotis yumanensis</i>	Yuma myotis	Yes	No
<i>Nyctinomops macrotis</i>	Big free-tailed bat	No	Yes
<i>Perimyotis subflavus</i>	Tri-colored bat	Yes	No
<i>Pipistrellus hesperus</i>	Western pipistrelle	Yes	No
<i>Tadarida brasiliensis</i>	Brazilian free-tailed bat	No	No
<i>Idionycteris phyllotis</i>	Allen's big-eared bat	Unknown	Yes

3.2—Recreation

Attractions

Based on geology, the majority of known recreational caves on BLM lands occur in the Colorado River Valley Field Office, with other caves near Cañon City, Salida, Grand Junction and Craig. Other BLM-administered caves exist throughout western Colorado. For example, <http://www.coloradocaves.org/> shows caves on BLM-administered lands, including Raven Cave near Grand Junction and mentions that there are hundreds of claystone caves in the western

Colorado desert. However, the majority of recreational caves in Colorado are not administered by the BLM.

Recreational use of abandoned mines on BLM-administered lands occurs, but it is highly discouraged through the “Stay Out, Stay Alive” program.

Recreational Caving Use

Records for the Colorado River Valley Field Office (CRVFO: Silt, Colorado) show 445 participants and an equal number of visitor days (i.e., 12-hour average length of stay). This includes 50 annual visitors to LaSunder Cave (having limited, gated recreational access administered by Colorado Cave Survey [CCS] under a BLM Cooperative Agreement). An undetermined amount of caving use occurs on other unnamed caves on BLM-administered lands in Colorado. There is no known commercially-outfitted or guided spelunking occurring on BLM-administered lands.

Information Outreach Network

A part of the affected human environment is the caving information network. This includes combined efforts of the caving community, the BLM and CPW.

3.3—Social and Economic Values

Currently, the BLM does not have complete data concerning visitor use regarding caving/spelunking. There is no known commercially-outfitted or guided spelunking occurring on BLM public lands, though individuals and non-commercial groups are known to be active. Without a firm number of participants, it is not possible to estimate the economic contribution that caving/spelunking on BLM lands provides in the State of Colorado. It is expected that the more popular sites would have a small, but measurable impact on local communities, due to increased visitation and resultant spending on food, accommodations and supplies in the nearby area.

The economic consequences of losing bat populations could be substantial. Bats are voracious predators of nocturnal insects, many of which are pests to agricultural crops, forests and humans (Boyles et.al. 2011, Kasso and Balakrishnan 2013). It is estimated that the loss of bats in North America would result in agricultural losses ranging from \$3.7 to \$5.3 billion/year (Boyles et.al. 2011). These estimated costs include the reduced cost of pesticide applications that are not needed to suppress insects consumed by bats.

CHAPTER 4—ENVIRONMENTAL IMPACTS

4.1—Wildlife

4.1.1 Impacts from No Action Alternative

Under the No Action Alternative, the BLM management of caves and abandoned mines used by bats would remain unchanged on BLM lands in Colorado. There is evidence indicating that human activity in caves and mines may be assisting in the spread of Pd/WNS. Cave visitors not using decontaminated gear could potentially transport the fungus (or other causative agent) on

their clothing and/or equipment from affected sites into unaffected sites. This could prove to have detrimental impacts to gregarious bat species that occur in Colorado, particularly BLM sensitive species that occur throughout the state.

The potential spread of Pd/WNS could also affect hibernating bat species not known to occur in Colorado, from migratory bat species that share roosting or other habitats with resident species that annually hibernate in Colorado. If Pd/WNS is discovered in Colorado and no action is taken, this could have detrimental effects to bat species populations across the state and potentially across the west. The effects could cause significant mortalities in local bat populations and could negatively affect bat populations throughout western North America as infected bats could transport Pd to other uninfected areas. Decontamination protocols will still be required with this alternative, but this alone may not be adequate for all potential scenarios and the different types of equipment that may be used.

4.1.2 Impacts from Proposed Action

The impacts from the Proposed Action would reduce the likelihood of Pd/WNS spreading in Colorado through human vectors, while allowing for use of caves that do not provide priority habitat for bat species. The proposed action will impose a 100-mile buffer around the site of Pd/WNS detection in Colorado. The implementation of the 100-mile closure on BLM lands will limit the potential for humans to unknowingly spread this fungus by visiting other nearby caves or mines. It will also limit transmission from infected bats based on assumptions of bat movements as disclosed in recent research efforts.

The 100-mile closure radius that would be implemented if Pd/WNS is detected within 100 miles of BLM land in Colorado is derived from two recent peer-reviewed studies. Both studies attempt to quantify how the Pd/WNS spore is transmitted and how far it can be estimated to travel, either by bats or human transmission. The first paper (Szymanski et al., 2009) refers to “within-season” movement of bats found in Virginia. This study states: “This profile was defined because the proximity to an affected site is believed to increase the susceptibility to becoming infected with WNS. The 75-mile radius was chosen to reflect the potential distance for within-season movement of bats, based on coarse empirical data of within-season spread of WNS in Virginia from 2008 to 2009 (Rick Reynolds, Virginia Dept. of Game and Inland Fisheries, pers. comm.).”

The other recent research we are citing to support our buffer distance is a master’s thesis (Ihlo 2013) that uses spatial modeling through Arc GIS to estimate the spread of the Pd fungus, particularly by a human carrier. This analysis considers the accessibility to infected sites by humans, distribution of bat species, climatic factors and the number of infected and uninfected sites within a given area. The researcher incorporates many components that may not be as relevant in Colorado, such as the proximity of large airports, but the overall analysis does take factors other than transmission via bats into consideration.

The radius for the expansion of spores is as follows: “The temporal expansion of spore transmission was based on the mean distance traveled between confirmed WNS positive sites in a single year (86.4 miles/139 km). The counties within this distance of current confirmed WNS-

positive counties could possibly have spores transmitted into their bat populations sometime in the next year (before end of winter 2014)” (Ihlo, 2013).

The 100-mile buffer is more conservative than the distances stated in these two studies and also gives the BLM a quantitative number that can be easily shared and administratively implemented throughout the state. This spatially conservative approach to limiting the potential spread of Pd/WNS through the closing of caves and mines within the buffer will give federal and state agencies an opportunity to address the outbreak and limit the impacts to local bat populations.

Negative impacts to bats could occur from users who enter BLM-administered caves and/or mines under a temporary closure, or from users who fail to properly decontaminate gear/clothing.

4.2—Recreation Resources

4.2.1 Impacts from the No Action Alternative

There are positive effects to recreational caving under the No Action Alternative. Positive effects include increased coordination and outreach with the Colorado Cave Survey, associated grottos and CPW. Increased communication and coordination with participants, coupled with increased interagency communications with CPW better positions all parties to improve the BLM’s understanding of and responsiveness to the caving community as well as protect important cave resource attractions, including beneficial bat habitat.

4.2.2 Impacts from the Proposed Action

For Part 1 of the Proposed Action, efforts to reduce potential human-caused introductions of Pd/WNS into BLM caves, both beneficial and adverse effects to recreational elements of the affected human environment will be much the same as for the No Action Alternative. For example, the decontamination protocol will still be followed, and the BLM will continue increased collaboration with the caving community and other agencies. Not requiring recreational cavers to decontaminate at sites that are less than 10 miles from the cave feature or site where decontamination of gear being used was last conducted on the same day will improve participants’ experiences and benefits.

The beneficial effects of the Proposed Action of collaborating with caving groups, other interested stakeholders and CPW of the proposed action would be substantial. These would include benefits to the cavers themselves and to the caving sport, to the sustainability of recreationally significant cave resources and to communities affected by their recreational use and enjoyment. This aspect of the proposal would simultaneously elevate the BLM’s collaborative involvement with the caving community and CPW while generating and securing meaningful inventory and monitoring data on caving recreational use associated with bat resources. No adverse effects to the human environment from this collaboration are envisioned at this time.

Negative effects to recreational caving from Part 2 of the Proposed Action would occur as all recreational access to caves possessing biologically important bat resources and lying within the 100-mile radius of confirmed sightings would be prohibited.

4.3—Social and Economic Values

4.3.1 Impacts from No Action

Under the No Action Alternative, no changes to spending and economic opportunities associated with recreational caving would occur. In addition, for individuals for whom bat populations provide a benefit (due to a value placed on bat sightings, or simply an existence value for the animals, and the ecological role that bats play) the potential for reduced bat populations would lead to a reduction in their own personal utility.

Under the No Action Alternative, the BLM would not take proactive measures to stop or slow the spread of WNS in Colorado. This could potentially lead to population decreases in multiple bat species across the state. This could have adverse consequences to the large agricultural economy that is present in Colorado.

4.3.2 Impacts from Proposed Action

Under the Proposed Action, changes to spending and economic opportunities associated with recreational caving would occur due to closures of certain BLM-administered caves if Pd/WNS is detected. This could lead to a small decrease in spending in nearby communities, especially if the closed cave was popular among the caving community. However, if alternative cave locations exist nearby that do not contain bats, then the impact may not occur at all. In addition, for individuals for whom bat populations provide a benefit (due to a value placed on bat sightings, or simply an existence value for the animals, and the ecological role that bats play) the potential for stable bat populations would lead to no change in their own personal utility.

Under the Proposed Action, the spread of Pd/WNS on BLM lands in Colorado would potentially be minimized. This would likely help sustain bat populations across Colorado. A stable bat population would continue to contribute to the control of various agricultural pests present in Colorado.

4.4—Cumulative Impacts

4.4.1 Wildlife

The No Action Alternative would have the greatest potential for adverse cumulative effects to bats on BLM-administered lands in Colorado. The BLM would not limit access to caves and mines on BLM-administered lands with this alternative. This alternative would potentially increase the risk of humans introducing or spreading Pd/WNS into BLM-managed lands in Colorado. This could have severe negative impacts on bat populations found throughout the state, particularly BLM state-listed sensitive species. If left unmanaged, Pd/WNS could spread to other populations throughout the West and impact bat populations throughout western North

America. The outbreak of Pd/WNS has had severe impacts to bat populations on the east coast and could affect bat populations similarly in Colorado.

The Proposed Action, when combined with WNS response plans that will be implemented in cooperation with other state and federal agencies, will likely minimize the cumulative impacts of a Pd/WNS outbreak in Colorado associated with the human vector. The immediate closure that would be implemented within the 100-mile buffer through this alternative would reduce the risk of Pd/WNS being introduced into unaffected caves and mines. Prohibiting human access to both contaminated and non-contaminated sites would reduce the likelihood of spreading Pd/WNS through contaminated caving gear and clothing. The closure of known bat use sites would also limit disturbances to bat species that use these sites for hibernation or other critical life functions. This immediate closure, along with the continued implementation of decontamination protocols for caves that do not provide bat habitat will reduce the potential negative cumulative impacts to a Pd/WNS outbreak in Colorado.

4.4.2 Recreation

The No Action Alternative would have the least potential for adverse cumulative effects to recreational cavers on BLM-administered lands in Colorado. Negative impacts and decreases in bat populations could diminish some recreational participant experiences if their expectations were to see bats on their caving trip.

The Proposed Action would have the most potential for adverse cumulative impacts to recreationalists when combined with cave closures throughout the state on other agency and privately-owned land. It is likely that if Pd/WNS is introduced in Colorado or within the 100 mile buffer, that the BLM would not be the only land manager to take action. Possible cave closures and limiting cave access would negatively impact the recreational caving community as their places to recreate would decrease substantially. However, this negative impact could be limited in its timeframe as the closure on BLM public lands would be reviewed after a year.

The proposed action could also have potential beneficial effects of increasing communication and collaboration with multiple stakeholders. These could be realized by working creatively with local communities to help sustain the BLM's collaborative work with the cavers for the mutual benefit of the caves, bats, cavers and communities.

4.4.3 Social and Economic Values

The No Action Alternative would have the least potential for adverse cumulative effects to social and economic values within local communities due to no possibility of caving closures being enacted. However, if the bat population in Colorado is in decline due to Pd/WNS, this could have unforeseen consequences to the agricultural industry.

The Proposed Action would have the potential for greater adverse cumulative effects to social and economic values within local communities due to the potential of caving closures on BLM lands and likely nearby closures on other public and private lands in the event of a Pd/WNS

occurrence. However, the closure actions would likely help prevent the further spread of Pd/WNS, thus minimizing the adverse effects in the long term.

The response plan as identified in the proposed action will likely contribute to a more stable bat population in Colorado. A stable and productive bat population will continue to control agricultural pests and the impacts they can have on the agricultural economy.

REFERENCES

Boyles, J.G., P.M Cryan, G.F. McCracken, and T.H. Kunz. 2011. Economic Importance of Bats in Agriculture. *Science* 332:41-42.

Ihlo, Christy and Paul Baker. 2013. Nicholas School of the Environment, Masters Thesis. Duke University.

Kasso, M. and M. Balakrishnan. 2013. Ecological and Economic Importance of Bats (Order: Chiroptera). *ISRN Biodiversity*. Article ID 187415, 14 pp.
www.hindawi.com/journals/isrn.biodiversity/2013/187415.

Szymanski JA, Runge MC, Parkin MJ, Armstrong M. 2009. White-nose syndrome management: report on structured decision making initiative. Department of Interior, U.S. Fish and Wildlife Service, Fort Snelling, MN, USA.

Colorado Bat Working Group. 2013. Biologically Important Bat Criteria.

LIST OF PREPARERS

Don Bruns, Outdoor Recreation Planner, Colorado State Office, Lakewood, CO

David Epstein, Economist, Colorado State Office, Lakewood, CO

Eric Freels, Wildlife Biologist, Tres Rios Field Office, Dolores, CO

Jim Goodbar, Cave/Karst Specialist, Washington Office, Carlsbad NM

Michael Hildner, Planning & Environmental Coordinator, Colorado State Office, Lakewood, CO

Kimberly Miller, Outdoor Recreation Planner, Colorado River Valley Field Office, Silt, CO

Bruce Rittenhouse, Branch Chief of Natural Resources, Colorado State Office, Lakewood, CO

Appendix 1. Colorado White-nose Syndrome Decontamination Protocol Addendum as developed by Colorado Parks and Wildlife.

All decontamination protocols as described in the current U.S. Fish and Wildlife Service protocol will be applicable to cave and mine visits in Colorado with the inclusion of the below information from the protocol dated 1/25/2011.

In areas of high cave density, however, circumstances may require that multiple caves be visited on the same day. Assuming that bat-to-bat transmission will likely account for the rapid spread of the fungus between caves in close proximity, and that only aspects of decontamination is going to be feasible within cave complexes visited on the same day in remote locations, the actions recommended in this protocol can be adjusted to accommodate field activities in these areas. Since limited hibernacula data show that bats easily move upwards of 10 miles in search of resources (i.e., food, mates, roost and hibernation sites) during portions of the fall, winter, and early spring, researchers should, at the very minimum, use full decontamination procedures on a daily basis and between any two caves more than 10 miles apart if surveying/monitoring multiple caves on the same day. Whenever there is a question, biologists and researchers should always choose the conservative approach of decontaminating gear, clothing, and equipment between each individual cave visited.

In Colorado, this will allow for visits to more than one site if the below stipulations have been met:

1. The sites will be visited on the same day. Decontamination should occur after each day of site visits.
2. Movement between the sites will occur by foot. If any vehicle will be used to travel between sites within the 10 mile distance limit, gear should be decontaminated or securely stored in a container before entering/mounting the vehicle (including automobile, ATV, mountain bike, horse, etc.). If the site being entered is further than 10 miles from any other site, and the gear or clothing has already entered, then that gear/clothing should be decontaminated or changed for clean gear/clothing.

Other clarifications of procedures include:

- Any item that comes in contact with contaminated gear (anything that has entered a site) will need decontamination. For example, if a backpack is put on while still wearing the coveralls/Tyvex suit worn in the site, the backpack will need to be decontaminated.
- Any item that will not be securely stored in a container should be decontaminated before placed in a vehicle. This includes outer clothing that has entered a site (i.e., do not get in or on a vehicle in clothing that has entered a site unless it is decontaminated). Vehicle interiors are impractical to decontaminate so should be kept clean.