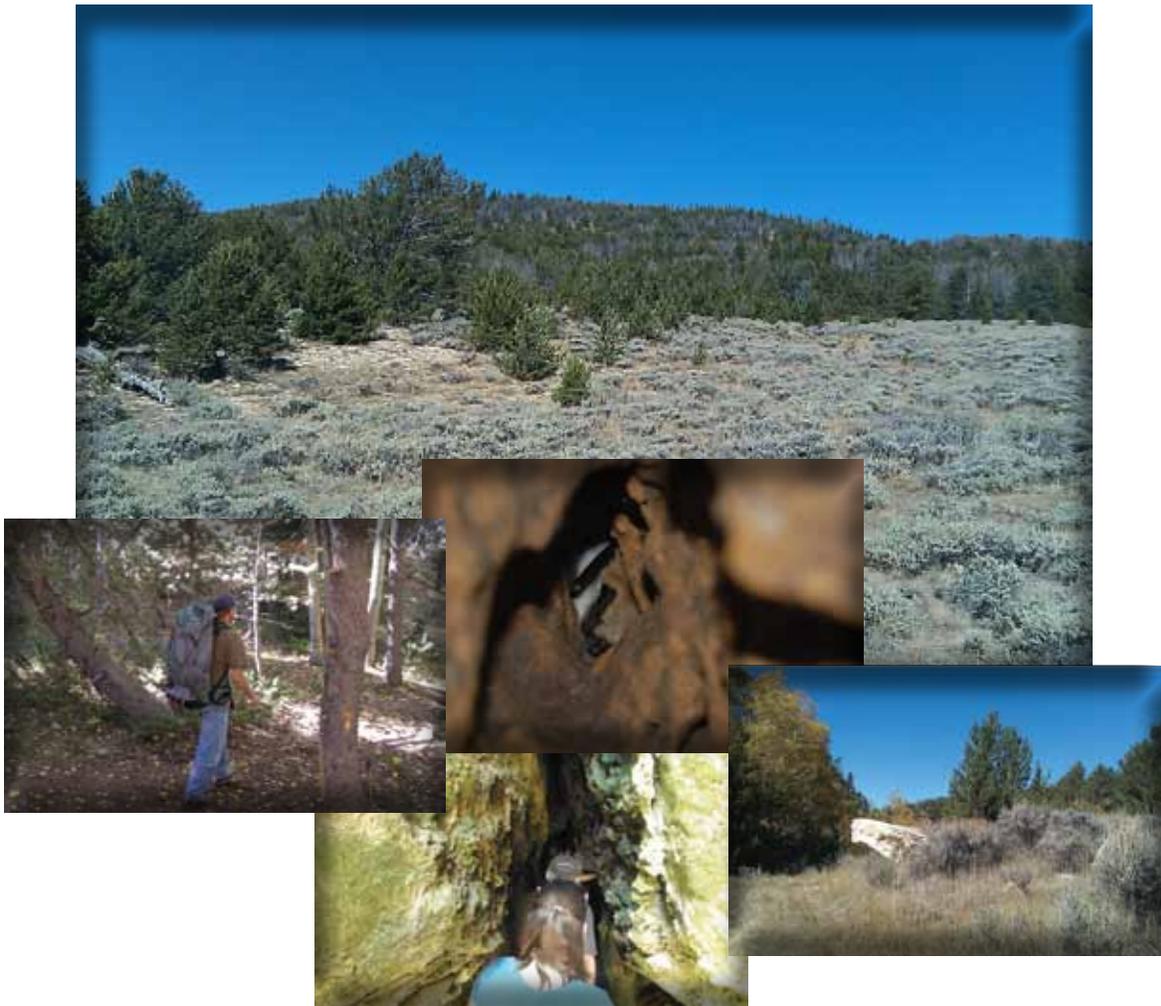


# Cave Creek Cave Area of Critical Environmental Concern Management Plan



Wyoming High Desert District – Rawlins Field Office

October 2011



The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

**BLM/WY/PL-11/057+1610**

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## CHAPTER 1

### INTRODUCTION

#### Need for the Management Plan

The preparation of an Area of Critical Environmental Concern (ACEC) Plan is necessary where special management attention is required to protect, or to prevent irreparable damage to, important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes; or, to protect human life and safety from natural hazards (United States Department of the Interior, Bureau of Land Management (USDI-BLM, June 1980).

A management plan is needed for the Cave Creek Cave ACEC, located in Carbon County, Wyoming, to protect and preserve cave resource values, improve the quality and safety of visitor experiences (USDI-BLM, 2009) and allow for scientific and educational opportunities to occur in the cave. The Cave Creek Cave ACEC was identified in the Rawlins Field Office's Record of Decision and Approved Rawlins Resource Management Plan (RFO RMP) in December 2008 (USDI-BLM, 2008). The Cave Creek Cave ACEC Plan provides objectives for long-term management of both the Cave Creek Cave and surface lands that make up the ACEC, and identifies management actions to protect the cave and surface resources.

#### Legal Authorities

In the Federal Land Policy and Management Act (FLPMA) of 1976 (PL/ 94-579), Congress declared a basic policy directing management, protection, development, and enhancement of all the public lands to protect certain environmental values. Specifically, FLPMA directs the BLM to manage public lands, such as Cave Creek Cave, in a manner that will:

*...protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values...will preserve and protect public lands in their natural condition...and that will provide for outdoor recreation and human occupancy and use [FLPMA (Sec. 102(a) (8)].*

In addition, in managing public lands, the BLM shall, by regulations or otherwise, take any action necessary to:

*...prevent unnecessary or undue degradation of the lands [FLPMA (Sec. 302(b)].*

In addition to establishing in law such basic protective management policies that apply to all the public lands, Congress has said that:

*...management of ...public lands is to include giving special attention to the protection of ACEC's for the purpose of ensuring that the most environmentally important and fragile lands will be given...early attention and protection.(USDI-BLM, 1980)*

The Federal Cave Resources Protection Act of 1988 (FCRPA-16 U.S.C. 4301-4309) requires federal agencies to:

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

This legislation further authorizes federal agencies to take such actions as may be necessary to further the purposes of FCRPA, including restriction of use of significant caves (USDI-BLM, 2009; FCRPA-16 U.S.C. 4301-4309).

#### Conformance with the BLM Land Use Plan

Overall RFO RMP management goals for ACECs, such as the Cave Creek Cave ACEC, are to protect the integrity of unique resource values, preserve historic significance, and provide opportunity for other uses. The management goals for the Cave Creek Cave ACEC located in the RFO RMP are designed to:

- (1) Protect the hibernaculum and maternity roost for several bat species located within Cave Creek Cave; and
- (2) Maintain back country setting conditions in the cave and provide recreational opportunities consistent with protecting a hibernaculum and maternity roost.

The Cave Creek Cave ACEC Plan would address the implementation of protection of cave resources and visitor enjoyment and safety, in accordance with the management decisions in the RFO RMP (USDI-BLM, 2008; USDI-BLM, 2009a).

#### ACEC Location and Environmental Setting

The Cave Creek Cave ACEC is located on public land in the Shirley Mountains, Carbon County, Wyoming (Figure 1). The Shirley Mountains are a relatively isolated mountain range located in the northern portion of Carbon County in south-central Wyoming. Geographic features of the Shirley Mountains, such as relatively small size, northern latitude and high elevation limit the

variety of flora and fauna found on the mountain. The elevation of the Shirley Mountains range from 8200 feet at the foothills to 9100 feet at the mountain peaks (USDI-BLM, 1995).

Forests are the most dominant vegetative communities on the Shirley Mountains and influence most other life in the area. The Shirley Mountains ecosystem is located within the Wyoming Basin Eco-region, but is somewhat atypical of this region, due to higher elevation of the mountain, as compared to the surrounding plain, and more accurately reflects the nearby Rocky Mountain Eco-region.

Within the Cave Creek Cave ACEC management area the principal vegetation type is limber pine, with stands of aspen and lodgepole pine scattered throughout the ACEC area. A description of the vegetation types located on the Shirley Mountains, including the Cave Creek Cave ACEC, are located in *Appendix A-1: Plant Species Located in the Cave Creek Cave ACEC*.

Cave Creek flows through the ACEC, from east to northwest, and is located within the East Shirley Mountain watershed. This creek drains into Sage Creek which flows into Pathfinder Reservoir.

Recreational activities within the ACEC area predominantly focus on Cave Creek Cave use by recreational cavers and members of the various cave grottos (caving clubs), as well as by students from the University of Wyoming as part of caving classes. However, hunting, hiking, biking, camping, wildlife/nature viewing, off-highway vehicle (OHV) use, sightseeing, and horseback riding also do occur adjacent to, and within, the ACEC area. The area does have the potential to contain other caves and sinks that have not been discovered.

## **Description of Cave Creek Cave**

Cave Creek Cave is located in the Madison Limestone and Tensleep Sandstone formation, at 8,190 feet in elevation (Figure 3). The total surveyed length of the cave is 2,048 feet (625 m). The main entrance to Cave Creek Cave is in a blind valley. The stream which once flowed into this entrance was diverted on private land in the mid-1950s; consequently, most water now flows past the cave (Figure 2), except during spring runoff when most of the water in Cave Creek goes underground in a series of small sinks upstream of the cave. On the south side of the valley, near Cave Creek Cave, there are several large dolines. A doline is a sinkhole or sink depression that is formed as a result of water dissolving surface limestone. One of these dolines is the entrance to Monsson's Mud Hole cave. These dolines may be connected to Cave Creek Cave.

In cave terminology, Cave Creek Cave is described as being rigorously controlled by jointing, as well as by the approximate eight degree southwest dip of the geologic formations (Figure 3). The overlying Tensleep Sandstone forms the gently dipping roof of the cave throughout most of its length. The entrance passages are joint-controlled, stream-enlarged tubes and fissures that jog sharply along the trends of the jointing system.

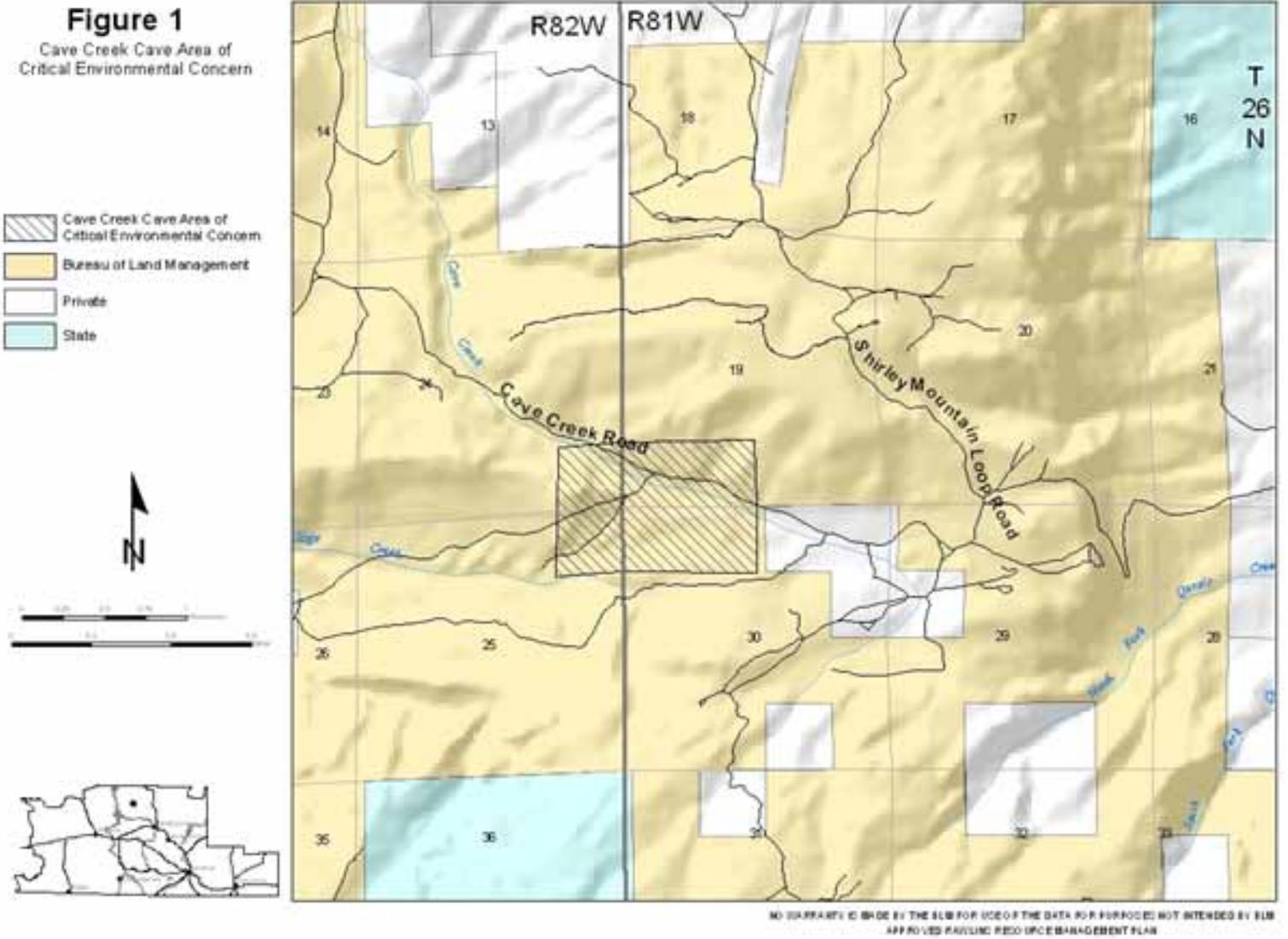
Within 400 feet of the entrance, the main passage enters an area referred to as History Hall (probably due to all the historic signatures on the walls). This large room is 30 feet wide, 15 feet high and 300 feet long. This room may have had a phreatic origin (pertaining to ground water) and has also broken down over the millennium. The cave continues past History Hall, through stream-cut fissure passageways that contain several stagnant pools. The passage then widens, lowering as it enters an area referred to as the Tokyo Philosopher's Room. A sandy clay fill blocks the back of this room, but a small crawlway to the right, near the end of the room, leads to additional passages.

In the spring or summer of 1973 this crawlway was blocked by flood waters which covered the floor. Reportedly, this point was believed to be the end of the cave previous to 1968 or 1969. Between 1969 and 1973 the crawl was open and led for about 75 feet to an area known as the Big Fissure where the cave continues to the southwest. It is not known how the crawlway became open.

Only the lower few feet of the cave in this fissure are developed in Madison Limestone; the rest is in the overlying fine-grained, cross-bedded Tensleep Sandstone. This part of the cave is believed to have been developed along a fault.

After several hundred feet the cave re-enters the limestone, leading to another large room which is 15 feet high, 25 feet wide and 150 feet long. The passage continues past this room for several hundred feet to two small pits which drop about 10 feet to, or through, what is known as the Sewer Pipe. This passage leads about 100 feet before pinching (squeezing or compressing) out. Above the two pits a crawlway exists that leads to the edge of a break-down filled room. This room may be the bottom of Slave Sink; however, further investigation is required to determine this fact.

The second entrance to the cave is in the bottom of a small doline, approximately 200 feet northwest of the main entrance. At one time, this may have been a sinking point for Cave Creek, but it appears now to take water only from the immediate area. A small, tight, joint-controlled passage from the doline connects with



*Mixed aspen and conifer stands*

**Figure 2**

Cave Creek with Road on Private Land - East of Area of Critical Environmental Concern

Cave Creek flows into the pond located on private land and then flows underground into Cave Creek Cave.



NO WARRANTY IS MADE BY THE BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM APPROVED BATTLE MOUNTAIN RESOURCE MANAGEMENT PLAN



*Mixed conifer stands*



the main passage about halfway between the main entrance and History Hall. This passage is occasionally blocked by sands and clays (Hill et al, 1976).

Relative humidity, air flow, and temperature measurements have been taken in the cave in years past by a variety of groups. *Appendix B: Relative Humidity, Air Flow, and Temperature Measurements for Cave Creek Cave* shows the measurements observed at different times of the year by biologists (during mist netting activities to identify bat species) and cavers exploring Cave Creek Cave.

## **Resource Management in the Cave Creek Cave ACEC Area**

### **Cultural/Historical Resources Management**

Several cultural resource inventories have been conducted within, and adjacent to, the ACEC including one inventory around the cave entrance. Prehistoric lithic scatters and open campsites are present in the general area; however, no cultural sites exist within the ACEC boundary. Additionally, with the exception of the historic inscriptions within the cave itself, there are no known historic sites in the ACEC area.

### **Cave Creek Cave**

Systematic archeological inventories of Cave Creek Cave need to be conducted. Prehistoric archeological materials and human remains are not known to be present in the cave. As the cave has not been fully inventoried or fully mapped, there is the potential for such materials to be identified in the future.

Several names and dates, which date back to the late 1800's, are scratched in the rock above the cave entrance. The interior of the cave, specifically History Hall, has been inscribed and painted with names and dates that date back to the late 19th century. None of the early inscriptions have been documented by professional archaeologists nor has the significance of these resources been evaluated. Many of the names and dates were placed there by local residents and/or folks traveling through the area. These examples of early signatures, and later graffiti, do provide useful information about past visitation to Cave Creek Cave and may be useful "teaching tools" about appropriate (and inappropriate) cave etiquette.

### **Fire and Fuels Management**

Fire and fuels management is designed to protect human life, property, communities-at-risk, and other communities, as well as enhance the public land resources through fuels management and appropriate management response (AMR). The AMR is not developed until

a wildland fire ignition occurs or prior to a prescription event. The AMR is not developed until a wildland fire ignition occurs. BLM's AMR to a wildland fire is based on an evaluation of risks to firefighter and public safety; the circumstances under which the fire occurs, including weather and fuel conditions; natural and cultural resource management objectives; protection priorities; and values to be protected. An AMR includes the use of wildland fire to protect, maintain, and enhance resources and, as nearly as possible, allow the wildland fire to function in its natural ecological role (USDI-BLM, 2008). An AMR considers the values to be protected, such as the ACEC area itself, and the costs of wildfire suppression. Additionally, the BLM fire management actions are required to complement and support State and local agency wildland fire management objectives through the AMR.

### **Forest Management**

The BLM is required to manage forest communities within the ACEC area for a combination of values including forest health, composition and diversity. Forest management is also required to consider the timber stand characteristics such as density, basal area, canopy cover, age class, stand health and understory within the ACEC area. In addition, there are woodland communities within the ACEC that need to be managed for a healthy mix of successional stages within the natural range of variation that incorporate diverse structure, height, age class and species composition into each forest stand type.

### **Lands and Realty Management**

The BLM manages the acquisition, disposal, withdrawal and use of public lands (such as right-of-way actions) within the Shirley Mountains and ACEC area to meet the needs of both internal and external customers. Although the ACEC itself contains only BLM-administered public land, there are private and state lands adjacent to the Cave Creek Cave ACEC area. The BLM is required to review and evaluate the needs and merits of withdrawals which have been identified for the Cave Creek Cave ACEC.

### **Livestock Grazing Management**

The Cave Creek Cave ACEC area is a small part of a large, livestock grazing allotment – the Shirley Mountain Allotment – and livestock graze within, and adjacent to, the ACEC area. Currently, the BLM administers two active grazing permits with a total of 547 animal unit months (AUMs). An AUM is a standard unit of measurement of the amount of forage necessary to sustain one cow/calf pair, or equivalent, for one month;

also, a unit of measurement that represents the privilege of grazing one animal unit for one month (USDI-BLM, 2008). The estimated carrying capacity for this allotment is 9-11 acres per AUM.

### Mineral Management

The Cave Creek Cave ACEC is open to oil and gas leasing; however the BLM is required to minimize the impacts to the environment, public health and safety and other resource values and uses, such as the ACEC area and Cave Creek Cave. The area is also open to geophysical exploration, and development of geothermal resources and non-energy leasable minerals. The Cave Creek Cave ACEC is closed to locatable mineral entry and mineral material disposals. Locatable minerals include metallic and nonmetallic minerals (e.g., gold, silver, and copper). Mineral materials include common varieties of sand, stone, gravel, pumice, clay, and pumicite.

### Off-Highway Vehicle Use Management

The BLM is required to manage OHV use and ensure the continued availability of OHV opportunities, as appropriate, within the ACEC area. The only roads in the ACEC are two-tracks that are maintained by the passage of vehicles. The ACEC is located to the west of the Shirley Mountains Loop Road, also known as the BLM Road 3115. The BLM Road 3115 is located south of the Carbon County Road 102, is approximately 20 miles in length, is gravel surfaced and is maintained by the BLM (Figure 1).

### Paleontology (and Geological) Resources Management

The ACEC is located in the Madison Limestone and Tensleep Sandstone formations. These formations are not considered significant sources of paleontological material. In addition, no significant paleontological resources have been identified within the ACEC.

### Recreation and Visitor Services Management

#### Cave Creek Cave

Cave Creek Cave has been visited by the public and cave enthusiasts for well over a century. A BLM visitor register is located in the History Hall (Figure 4). History Hall contains numerous signatures on the walls dating back to the 1800's. Presently, members of local grottos (caving associations/clubs) are probably the largest group of visitors to this cave.

Based on data collected by the BLM, the highest levels of visitation to Cave Creek Cave occur in the summer months (it is difficult to actually get to the cave prior to mid-June due to snow levels). The Shirley Moun-

tains Loop Road, which is used to access the cave, is generally impassable during the winter and late-spring months. Recreational visits are usually day use only, although overnight camping does occur just outside of the cave. The RFO RMP provides information to the public about the cave, when requested, but has no brochures, maps, or other information about the cave. In addition, there are no BLM road signs to Cave Creek Cave at this time.

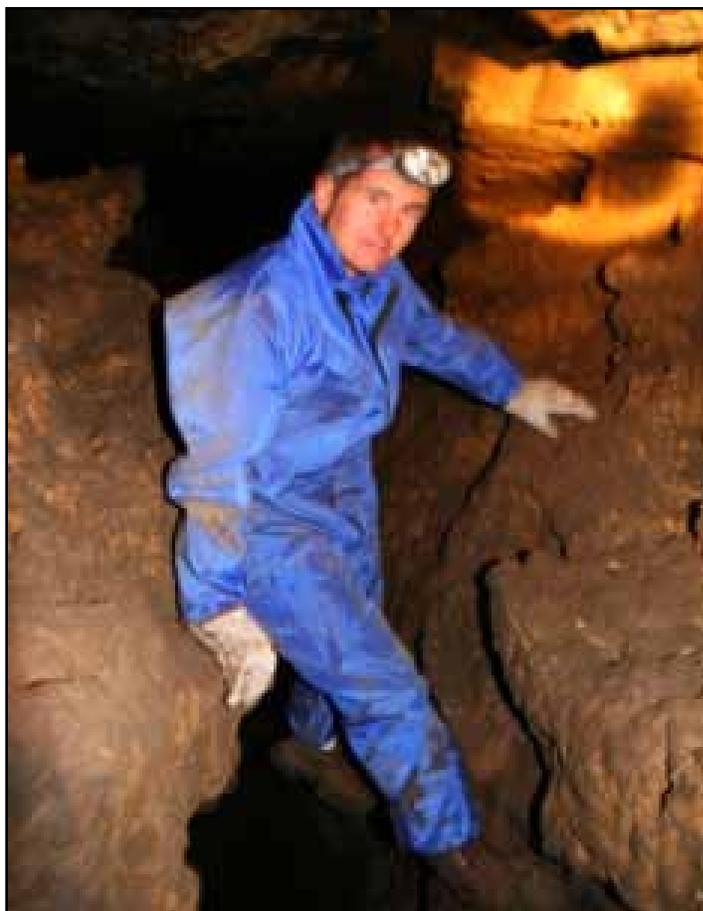


Figure 4: A Cave Creek cave recreationist exploring the cave's interior chambers.

### Transportation and Access Management

A comprehensive travel and transportation management network provides both public access and the BLM-administrative access to public lands. A transportation system may contain a combination of federal, state, and local government improved highways and roads, as well as improved and unimproved two-track roads and trails. The Shirley Mountains Loop Road is an improved gravel road that provides primary access to the Shirley Mountains and the Cave Creek Cave. A two-track road, accessible from the Shirley Mountains Loop Road, crosses both public and private land through the intermingled land ownership in the area.

Access to the cave, at this time, requires permission to cross private property. The BLM is currently analyzing the possibility of developing a new route across public land to access the Cave Creek Cave by constructing a two-track road to the north-east of the existing two-track (which crosses private land). The BLM Travel and Transportation Management Planning (TTMP) process will be incorporated into this ACEC plan if any existing roads are proposed to be closed or modified or if any new roads are proposed to be constructed within the ACEC area. All roads will be designed, constructed (or reconstructed) and maintained to the minimum standards found in the BLM Manual Section 9113.

### Visual Resource Management

The RFO RMP contains visual resource management (VRM) goals, objectives and management actions that are designed to influence how public land management will proceed. VRM classes, determined through the land use planning process, provide a basis to determine actions that are required for visual resources management. The ACEC lies within a BLM Visual Resources Management (VRM) Class II area. The objectives for the VRM Class II are listed below in Cave Creek Cave ACEC Management Direction (Objectives and Actions).

Visual quality of the area is largely influenced by the open timber stands and patchy sagebrush communities in the area. The form, line, and texture of the area are described as bunched with low line of sight. The line is broken by patches of vegetation. The texture is both course and smooth due to the juxtaposition of the mixed timber, shrub plant communities, and boulder and rock formations located at the entrance of the cave. The color is tan, green, and gray.

### Water Quality, Watershed, and Soils Management

Cave Creek and the South Fork of Sage Creek are located within the ACEC. Cave Creek is classified under the Wyoming Surface Water Classification List as a Class 3B stream and the South Fork of Sage Creek is classified as a Class 2AB stream. A Class 3B stream has a designated use for, and is managed for, aquatic life, recreation, wildlife, agriculture, industry and scenic values. A Class 2AB stream has a designated use for, and is managed for, drinking water, game fish, non-game fish, fish consumption, other aquatic life, recreation, wildlife, agriculture, industry and scenic values (DEQ, June 21, 2001).

Water quality for these two creeks is believed to be good to excellent and sediment yields are considered low due to the types of vegetation, soils, stable organic

pads, as well as low use by people. Water quantity is largely dependent upon snowmelt. Snowmelt makes up 80% of the 15-20 inches of annual precipitation.

Soils in the area are very shallow to moderately deep sandy loams, with some limestone rock outcrops. These soils exhibit a slight water erosion hazard potential and a moderate wind erosion hazard potential.

### Cave Creek Cave

Cave Creek is a hydrologic resource that supports diverse riparian areas within and adjacent to the ACEC area. This hydrologic resource is an essential component of bat habitat. Water is not only important to wildlife for drinking, but it also provides important foraging habitat, abundant insect prey, increased vegetation and structural diversity, and corridors for daily travel and migration (Wyoming Game and Fish Department [WGFD] 2011).

There is an historic, man-made water diversion, constructed in the 1960s that has had a major effect on the water which, prior to the diversion, entered the cave. Currently, there is water in the cave; however, the water amounts have changed to the extent that calcite rafts are starting to form in pools that show a recent history of continuous flow (Gookin, 1992).

### Wildlife and Fisheries Management

There are 200-plus common species that have been documented as occurring in, or at least migrating and/or moving through, the Shirley Mountains' ecosystem and Cave Creek Cave ACEC area. These species are located in *Appendix A-2: Common Wildlife Species Inhabiting and/or Migrating through the Shirley Mountains Ecosystem [including the Cave Creek Cave ACEC]*. This indicates that the Shirley Mountains and the ACEC are not biologically isolated from other habitats found in the Rocky Mountains.

There are Endangered, Threatened, Proposed, and/or Candidate species (T&E species) that have the potential to occur within the RFO area; however, these species are not found in the Cave Creek Cave ACEC area (*Appendix A-3: Endangered, Threatened, Proposed, and/or Candidate Wildlife & Plant Species within the Rawlins Field Office, but that are not Located within the Cave Creek Cave ACEC*). Future proposed projects within the Cave Creek Cave ACEC may necessitate consultation with the U.S. Fish and Wildlife Service (FWS) to determine if T&E species are located within the area or if projects will result in any water depletion effects to the Platte River System. In addition, there are several BLM Wyoming State Sensitive Species (Sensitive Species) that have the potential to occur within the RFO area (*Appendix A-4: BLM Wyoming*

State Sensitive Species Located within the Rawlins Field Office; those in the ACEC Area are Highlighted) which are highlighted yellow in Appendix A-4 (USDI-BLM, 2009a).

### Cave Creek Cave

In the past, wildlife population surveys in Cave Creek Cave were periodically completed. Wildlife that has the potential to occur in the cave include invertebrates, reptiles, amphibians, and mammals—including bat species. Bat species require access to open water where they can drink in flight, and the pond east of Cave Creek Cave provides that habitat type (Figure 2). High quality riparian habitat supports a much richer insect fauna than surrounding upland areas and provides valuable cover for foraging bats (WGFD 2011). The areas surrounding the pond provides potential roosting habitat, including snags with loose bark.

In September 1989, August 1990, and August 1992, three separate mist netting projects were conducted on the Shirley Mountains. Eight species of bats that were captured in the vicinity of the cave include the big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), little brown bat (*Myotis lucifugus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and fringed myotis (*Myotis thysanodes*). The fringed myotis, long-eared myotis, and Townsend's big-eared bat are currently on the *BLM Wyoming State Director's Sensitive Species List [Animals and Plants]*(BLM WY Sensitive Species) list. Several species of these bats are believed to utilize the cave for their hibernacula (a shelter occupied during the winter by a dormant animal). Constant and appropriate air flow, temperatures, and humidity levels are crucial to hibernating bats. This cave is known to serve as an important roosting site for these bats (USDI-BLM, 1995; Priday *et al*, 1996; Taylor, 2006).

The WGFD, in cooperation with the BLM, conducted a two-year project between 1994-1996 to inventory caves and abandoned mines on public lands to document bat habitat potential. The WGFD personnel visited Cave Creek Cave on August 16, 1994. Forty-four bats were captured, including 23 little brown bats, 12 long-legged bats, six fringed myotis, two long-eared myotis, and one unknown *Myotis* species. It was concluded that Cave Creek Cave served as a night roosting site. A hibernacula survey was conducted on December 13, 1995. Twenty-nine bats were observed hibernating, including 11 Townsend's big-eared bats, three Western small-footed myotis (Figure 5), and 15 little brown bats (Figure 6 (Priday *et al*, 1996).



**Figure 5:** Western Small-footed Bat (*Myotis ciliolabrum*) in Cave Creek cave.



**Figure 6:** Little Brown Bat (*Myotis lucifugus*) roosting in Cave Creek cave.

On August 3 and from August 8-11, 1994, BLM biologists mist netted in front of Cave Creek Cave. Species observed in those five (5) days included the big brown bat, long-eared myotis, little brown bat, and fringed myotis (USDI-BLM, 1994). The BLM biologists also observed Western small-footed bats (*Myotis ciliolabrum*) in Cave Creek Cave on October 29, 2008.

In addition to finding bat species in the cave, cavers from the Wind River Grotto explored the cave on June 20, 1992, and observed two species of invertebrates crawling around on the calcite rafts in the pool areas. Both species were pure white and approximately 1mm in length. One species was clearly a small spider. The other was more crustacean-like. The group did not gather samples at that time since the invertebrates were in such poor abundance and their newly formed rafts were so delicate (Gookin, 1992).

### White-Nose Syndrome

White-nose Syndrome (WNS) is named after the white fungus that grows on the noses, ears or wing mem-

branes of infected bats; not all bats infected with WNS will demonstrate symptoms. This fungus was discovered in New York in 1996 and, to date, over a million bats are estimated to have died from WNS. Scientists believe the fungus irritates hibernating bats, causing them to wake up more often and burn off accumulated fat stores faster, thus leading to death by starvation or freezing. Human activity has been implicated in the transfer of this fungus among bats and caves. White-nose Syndrome has not yet been documented in Wyoming; however, it is believed the fungus will continue to spread and eventually affect bats throughout much of the United States (WGFD 2011).

## **Management Issues for the Cave Creek Cave ACEC Area, with an Emphasis on Cave Creek Cave**

The following issues for the Cave Creek Cave ACEC were identified by the public and the BLM during the scoping process for the RFO RMP.

### **Cultural/Historical Resources Issues**

Systematic inventories of cultural resources have not been conducted at this time; however the BLM intends to inventory resources within the ACEC as described below in Chapter 2 (*MANAGEMENT DIRECTION [GOALS, OBJECTIVES AND MANAGEMENT ACTIONS]*). Measures will be implemented to educate the public on the historical value of inscriptions located in History Hall (USDI-BLM, 2009b).

### **Fire and Fuels Management Issues**

The main issue related to fire and fuels management is the requirement, and yet the risk, of using fire to enhance and protect the public land resources on the Shirley Mountains. The BLM can manage fire to reduce losses from catastrophic wildland fire and restore ecosystem functions. The ACEC contains timbered habitat; however, it should be noted that many stands of timber within the ACEC are infested with mountain pine beetles and white pine blister rust.

### **Forest Management Issues**

Maintenance of vegetation resource values within the Cave Creek Cave ACEC, while allowing for management of consumptive uses, is a difficult issue to resolve within forest management. The BLM must determine a balance between uses, especially since forest health contributes to watershed and riparian area protection, soil stabilization and maintenance and enhancement of wildlife habitats found both within, and adjacent to, the ACEC.

One issue is the white pine blister rust and mountain pine beetle epidemic infestations that are occurring on the Shirley Mountains, specifically in the lodge-pole and limber pine communities. Aspen stands are experiencing bleeding rust epidemics (where clones experience die-offs), complete stand replacements, and/or are being encroached upon by conifer trees.

One issue relates to mature conifer stands within, and adjacent to, the area that are in very poor health and contribute to a hazardous fuel load and high fire danger. The woodland forest is currently dominated by mature-, and over-mature, timber stands. The understory of conifer stands is heavily fuel loaded, with dead fall and wind-throw (resulting from insect and disease infestations). The deadfall accumulates over time and creates ladder fuels which allow catastrophic fire events to occur. These types of fires can impact the ACEC; therefore, forest health treatments may be needed to preserve the woodland characteristics and values of the area for future generations.

Another issue is the small size of the ACEC. Since the area is relatively small in size, the forested areas adjacent to the ACEC would need to be managed in coordination with the forested areas within the ACEC area.

### **Lands and Realty Management Issues**

The main issue is the lack of easy legal public access to the ACEC. Another issue related to lands and realty management within the ACEC area is to improve management efficiency in areas of scattered or intermingled landownership (which aids in legal public access). At this time, there is no legal public access along the existing two-track that provides vehicle access to the cave entrance. The public can access the ACEC area on foot; however, this method is not as user-friendly for the public.

### **Minerals Management Issues**

The ACEC area is open to oil and gas leasing. The main issue for the ACEC is to intensively manage oil and gas exploration and development within the ACEC in the event that drilling occurs.

### **Off-Highway Vehicle (OHV) Use Management Issues**

The RFO RMP allows for OHV use on the Shirley Mountains; however, during winter months it is difficult to access most of the mountains due to snow depth. OHV use is usually greatest during the fall months when hunting-season occurs, but there is some use during the summer months. The main issue within the

ACEC area is to be able to manage OHV use, and ensure the continued availability of OHV opportunities, without causing harm to the natural resources in the ACEC.

### **Paleontology (and Geological) Resources Issues**

At this time, there is no known graffiti damage within the cave; however, if this does occur in the future there are management opportunities identified below in Chapter 2 (*MANAGEMENT DIRECTION [GOALS, OBJECTIVES AND MANAGEMENT ACTIONS]*) to address damage.

### **Recreation and Visitor Services Issues**

The expected uses within the ACEC area are mostly the caving activities associated with Cave Creek Cave. Recreational use within the Cave Creek Cave may negatively impact bat species during critical life-history time periods, specifically during winter hibernation. Additionally, recreationists could damage historic features within Cave Creek Cave, either intentionally or unintentionally (Figure 7).



**Figure 7:** Visitors exploring Cave Creek cave

Visitation to the cave usually occurs during the summer and fall. Access to the cave entrance is difficult in the winter due to deep snow along the main access road. One issue is to determine the proper visitor use numbers. This issue is discussed further in Chapter 2 (*MANAGEMENT DIRECTION [GOALS, OBJECTIVES AND MANAGEMENT ACTIONS]*).

### **Transportation and Access Issues**

At this time, there is no public access across the private property adjacent to the public land where the ACEC is located. The BLM will need to obtain public

access to the ACEC to allow visitors to legally visit the cave.

In addition, there are no BLM road signs to Cave Creek Cave at this time; however, the need for signs is identified in this section.

### **Visual Resource Issues**

An issue pertaining to visual resources is that any management action is required to meet the VRM Class objective. VRM objectives consider forested areas adjacent to, and within, the ACEC.

### **Water Quality, Watershed, and Soils Resource Issues**

There is an historic water diversion that is located near the two-track in the ACEC. There is some resource damage from erosion that has occurred as a result of water flowing through the diversion. Management recommendations to control damage are discussed further in Chapter 2 (*MANAGEMENT DIRECTION [GOALS, OBJECTIVES AND MANAGEMENT ACTIONS]*).

It is critical to protect the surface and sub-surface environment in which caves develop, including soil resources, surface landforms, natural drainage patterns, hydrologic systems and cave micro-climate and ecosystem. Actions that alter soil resources must be managed to reduce and/or eliminate damage to these resources.

### **Wildlife and Fisheries Resources Issues**

Systematic inventories of cave life forms have not been conducted and baseline biological data is lacking (USDI-BLM, 2009b). Mist-net surveys to identify bat species have been completed, but a systematic, scientific study method was not used. Surveys will be required to identify fauna and flora located within the cave. For example, Figure 8 shows an unidentified species of a spore that needs to be inventoried in the future.



**Figure 8:** Unidentified spore species in cave.

**Public Participation in the Planning Process**

Public scoping for Cave Creek Cave management occurred during the RFO RMP revision from February 2003 through December 2008. Goals, objectives and management actions specific to the ACEC are included in the RFO RMP. This draft ACEC plan has been developed by an interdisciplinary team of resource

specialists from the BLM RFO. This draft plan has been sent to local, state and other federal agencies, as well as organized cave grottos, recreation groups and other interested publics.

Comments provided by the public through review of this draft will be considered during development of the final ACEC plan.

## CHAPTER 2

# MANAGEMENT DIRECTION (GOALS, OBJECTIVES AND MANAGEMENT ACTIONS)

The following management direction within the RFO RMP contains the goals, objectives, and management actions that will be used to guide and influence the future management of the Cave Creek Cave ACEC. Management actions for resources and resource uses are often connected; therefore, the comprehensive review below is required to ensure a full understanding of how the ACEC will be managed.

### Cave Creek Cave ACEC Management Direction (Goals)

The Cave Creek Cave ACEC is 240 acres in size. The management direction concentrates on the subsurface cave resources and uses, specifically for wildlife species (such as bats) and public recreation opportunities. The goals identified in the RFO RMP for the *Special Designations and Management Area -Cave Creek Cave ACEC* area are to: (1) Protect the hibernaculum and maternity roost for several bat species located within Cave Creek Cave; and (2) Maintain back country setting conditions in the cave and provide recreational opportunities consistent with protecting hibernaculum and maternity roost.

The goals identified in the RFO RMP for management actions for other resources and resource uses that are applicable to, and interconnected with, the Cave Creek Cave ACEC Plan include the following:

**Cultural Resources:** (1) Preserve and protect cultural resources to ensure that they are available for appropriate uses by present and future generations; and (2) Promote stewardship, conservation, and appreciation of cultural resources.

**Fire and Fuels Management:** (1) Protect human life, property, communities at risk, and other communities, and enhance and protect the public land resources through fuels management and AMR considering values to be protected and costs of suppression.

**Forest Management:** (1) Manage forest stand communities for health, composition, and diversity (considering density, basal area, canopy cover, age class, stand health, and understory) through forest management practices and to provide late successional vegetation for timber production while providing for multiple use; and (2) Manage woodland communities (such as aspen, limber pine, and juniper) for a healthy mix of successional stages within the natural range of varia-

tion that incorporate diverse structure and composition into each forest stand type.

**Lands and Realty:** (1) Manage the acquisition, disposal, withdrawal, and use of public lands to meet the needs of internal and external customers (i.e., to ... preserve important resource values).

**Livestock Grazing:** (1) Maintain and/or enhance livestock grazing opportunities and rangeland health.

**Minerals:** (1) Manage mineral resources from available BLM-administered public lands and federal minerals while minimizing the impacts to the environment, public health and safety, and other resource values and uses.

**Off-Highway Vehicles (OHV):** (1) Manage OHV use and ensure the continued availability of OHV opportunities.

**Paleontology:** (1) Maintain the integrity of the scientific value of paleontological resources; and (2) Promote stewardship, conservation, and appreciation of paleontological resources.

**Recreation and Visitor Services:** (1) Ensure the continued availability and accessibility of outdoor recreational opportunities; and (2) Manage recreation resources to accommodate existing and future uses.

**Shirley Mountains Special Recreation Management Area:** (1) Ensure the continued availability and diversity of outdoor recreation opportunities in the Shirley Mountains.

**Transportation and Access Management:** Develop and maintain a transportation management system to accommodate public demand for legal access through and across public lands and to meet resource management needs and objectives.

**Visual Resource Management:** (1) Manage public lands according to VRM classes that are determined based on land use allocation decisions made in the RFO RMP.

**Water Quality, Watershed, and Soils Management:** (1) Maintain or improve surface and groundwater quantity and quality consistent with applicable state and federal standards and regulations; (2) Control or remediate sources and causes of pollution on federal lands in cooperation with other federal, state, and local agencies and private entities; (3) Maintain or re-estab-

lish proper watershed, wetland, aquifer, riparian, and stream functions to support natural or desired surface flow regimes that meet state water quality standards; (4) Minimize or control contributions of non-point source pollution from federal lands to all receiving waters; and (5) Provide for availability of water to support uses authorized on federal lands, where appropriate.

**Wildlife and Fisheries:** (1) Manage for the biological integrity and habitat function of terrestrial and aquatic ecosystems to sustain and optimize distribution and abundance of all native, desirable non-native, and Special Status fish and wildlife species; (2) Manage or restore habitat to conserve, recover and maintain populations of native, desirable non-native, and Special Status Species consistent with appropriate local, state, and federal management plans and policies; and (3) Manage wildlife and fish habitat to support recreational and educational benefits and opportunities for the public.

### **Cave Creek Cave ACEC Management Direction (Objectives and Actions)**

Cave Creek Cave is known to contain habitat for at least five identified bat species. This cave is a very significant summer/fall night roost. In addition, the cave is used as a winter hibernaculum as well.

The following sections identify the RFO RMP management direction for the ACEC area. Some of the RFO RMP objectives and management actions are identified for the ACEC area in general, while others pertain to the Cave Creek Cave itself. To supplement these actions, Additional Management Opportunities have been identified for various programs listed below that may be implemented in the future pending project-specific or site-specific environmental review consistent with the National Environmental Policy Act of 1969 (NEPA). These Additional Management Opportunities are listed under the *Additional Management Opportunities* heading under the various resource categories in the following sections.

#### **Objectives:**

- (1) Maintain and protect the cave ecosystem for wildlife species, especially bats;
- (2) Accommodate recreation demand for caving while protecting sensitive cave resources; and
- (3) Acquire legal public vehicle access to the cave entrance (USDI-BLM, 2008).

#### **Management Actions:**

- (1) The Cave Creek Cave area (240 acres) will be managed as an ACEC.

### **Cultural/Historical Resources Management Objectives and Actions**

In order to protect cultural and historical resources in the ACEC, and especially in the cave, include the following:

#### **Objectives:**

- (1) Monitor the condition of historic properties that are known to be under threat from development or vandalism;
- (2) Develop a public outreach and education program to instill a conservation ethic in the public regarding cultural resources;
- (3) Identify cultural resources in the RFO area by defining priority geographic areas for new field inventory, based on probability for unrecorded significant cultural resources; and
- (4) Develop and maintain interpretation of cultural resources in areas of high public interest and access.

#### **Management Actions:**

- (1) Monitor the condition of historic properties that are known to be under threat from development or vandalism.
- (2) Develop a public outreach and education program to instill a conservation ethic in the public regarding public resources.
- (3) Develop and maintain interpretation of cultural resources in areas of high public interest and access.
- (4) Implement protective measures for threatened sites based on the result of Section 110 inventory and monitoring.

#### **Additional Management Opportunities:**

- (1) Systematically conduct archeological inventories of Cave Creek Cave.
- (2) Professionally record historic inscriptions and evaluate these and any other cultural resources documented for inclusion in the National Register of Historic Places.
- (3) Identify and clearly mark main routes within the cave to prevent damage to cultural resources.
- (4) Remove spray painted graffiti, if identified, from the cave.
- (5) Increase public awareness of appropriate cave etiquette (USDI-BLM, 2009b).

## Fire and Fuels Management Objectives and Actions

To implement the fire and fuels management program for the BLM in the ACEC area the following should occur:

### Objectives:

- (1) The BLM will first provide for firefighter and public safety;
- (2) Minimize disturbances resulting from fire suppression activities on public lands; and
- (3) Suppress wildland fires in identified priority areas, including those in areas of significant cultural sites.

### Actions:

- (1) The ACEC is designated an AMR fire suppression area. Heavy equipment use will be limited in this area (USDI-BLM, 2008).
- (2) Rehabilitation and restoration efforts specific to a fire event will be undertaken to protect and sustain ecosystems, public health and safety, and to help communities protect infra-structure.
- (3) Wildland fire for resource benefit will be used to protect, maintain, and enhance resources, and, as nearly as possible, allow fire to function in its natural ecological role.

## Forest Resource Management Objectives and Actions

### Objectives:

- (1) Maintain, restore, and enhance all forest communities in accordance with Wyoming Standards for Healthy Rangelands (forestlands), the healthy Forest initiative, and Healthy Forest restoration Act of 2003; where there are adjoining private and state forestlands, work cooperatively to attain the objective;
- (2) Maintain, restore, and enhance commercial forest communities for sustainable production and, where feasible, meet public demand for harvest of wood products (both minor and commercial quantities; i.e., saw timber, post and poles, firewood, Christmas trees, wildlings and transplants) and improve opportunities to harvest forest products while providing for other forest values and uses; where there are adjoining private and state forestlands, work cooperatively to attain the objective;
- (3) Utilize inventory and monitoring data to reduce fuels overloading within forest and woodland communities within identified areas of overloading;

- (4) Maintain, restore, and enhance forest stands to supply forest products to the public consistent with forest health, landscape restoration, and reduction of forest fuels objectives in coordination with private, local, state, and federal plans and policies; and
- (5) Maintain, restore, and enhance aspen communities.

### Actions:

- (1) The management of sales of minor wood products will occur to ensure that forest product removal in the area does not affect the temperature of underground water entering the cave.
- (2) Timber harvesting will not be allowed within one-quarter mile of the bat cave complex to protect the cave system.
- (3) Forests and woodlands will be managed using natural processes, along with chemical, mechanical, and biological treatments.

### Additional Management Opportunities:

- (1) Protect and preserve large tracts of forests and woodlands, near, and adjacent to, Cave Creek Cave, which provides roost and foraging resources for bats.
- (2) Leave at least 90 percent of the existing canopy in the Cave Creek Cave watershed, and adjacent watersheds, where bats are likely to exist.
- (3) Manage for vertical and horizontal heterogeneity, a diversity of native plants, and a variety of age classes to provide habitat for a diverse insect community and a variety of roosting opportunities for bats.
- (4) Protect and maintain water features within the forest area to provide a source of water as well as important foraging habitat and migration and commuting routes.
- (5) Maintain, restore, and regenerate aspen stands within coniferous forests. Protect large stands of aspen trees, which are strongly preferred by bats and primary cavity excavators.
- (6) Conduct pre-harvest bat inventories to document bat use and habitat inside proposed timber harvest boundaries and firewood-cutting areas, and evaluate the impact of harvest on bat foraging and roosting habitat.
  - (6a) Retain trees known to be used by bats for roosts. The reuse of trees by bat colonies and the use of some trees more heavily than others suggest some bats exhibit long-term

fidelity to trees and emphasize the importance of protecting those particular existing roosts trees.

- (7) Preserve all live trees with cavities, dead-topped trees, snags used by bats, soft snags, and from six hard snags per hectare (2.5 per acre) to 21 per hectare (8.5 per acre). Retain an abundance of live trees of various ages to replace existing snags over time and maintain snag densities in the future.
- (8) Where possible, avoid post-fire salvage logging. Where salvage logging is inevitable, remove trees from one area of the burn only, leaving another representative area intact that retains the full complement of snag sizes and densities (WGFD 2011).

### **Lands and Realty Management Objectives and Actions**

#### **Objectives:**

- (1) Identify the BLM-administered lands surrounding the Cave Creek Cave ACEC that may be available for land tenure adjustment;
- (2) Develop and maintain a landownership pattern that will provide better access for management and protection of the public lands;
- (3) Utilize appropriate actions to help solve problems related to intermixed landownership patterns; and
- (4) Manage public lands to be consistent with goals and objectives of other resource programs.

#### **Actions:**

- (1) Public lands are closed to land tenure adjustments, including sale. Withdrawals will be pursued.

### **Livestock Management Objectives and Actions**

#### **Objectives:**

- (1) Maintain, restore, and enhance livestock grazing to meet Wyoming Standards for Healthy Rangelands;
- (2) Encourage grazing permittees and the interested public to participate with the BLM to monitor and evaluate rangeland health to determine appropriate management actions; and
- (3) Utilize livestock grazing management techniques to maintain vegetation communities and ecosystem functions, in consultation and coordination with grazing permittees and with participation by the interested public. Utilize data collected from

scientifically-based inventory and monitoring techniques to support decisions that authorize livestock grazing levels and management.

#### **Actions:**

- (1) The Cave Creek Cave ACEC area is available for livestock grazing.
- (2) The current amounts, kinds, and seasons of livestock grazing use will be authorized until monitoring, field observations, ecological site inventory, or other data acceptable to the BLM indicates a grazing adjustment is needed as appropriate.

### **Minerals Management Objectives and Actions**

#### **Objectives:**

- (1) Provide opportunities for exploration and development of conventional and unconventional oil and gas, coal, and other leasable minerals.

#### **Actions:**

- (1) Public lands are closed to locatable mineral entry (240 acres). Withdrawals from locatable mineral entry will be pursued.
- (2) Public lands are closed to mineral material disposals.
- (3) The area is open to oil and gas leasing. Surface disturbing activities will be intensely managed to meet the objectives of the ACEC.

### **Off-Highway Vehicle Use Management Objectives and Actions**

#### **Objectives:**

- (1) Provide for the health and safety of visitors;
- (2) Locate and manage OHV use to prevent or mitigate resource damage resulting from OHV uses;
- (3) Coordinate with other programs to minimize conflicts and adverse impacts on OHV opportunities; and
- (4) Provide public education regarding appropriate use of the BLM lands.

#### **Actions:**

- (1) The Cave Creek Cave ACEC area is open to use of motorized, over-the-snow vehicles provided they do not adversely affect wildlife or vegetation.
- (2) Travel management areas within the Cave Creek Cave ACEC area are defined as "limited to Designated Roads and Trails".
- (3) Off-road motor vehicle use for "necessary tasks" is allowed. This includes activity conducted as part of an authorized use of the public lands re-

quiring the use of a motorized vehicle (examples include surveying and staking for Notices of Intent to conduct geophysical activities, Applications for Permits to drill, and Rights-of-Way actions; repairing range improvements; managing livestock).

- (4) In localized areas, temporary, seasonal, or permanent closures to motorized vehicle use may occur for public health and safety concerns or the protection of resources.
- (5) OHV use to retrieve big game kills is allowed within 300-feet of existing roads and vehicle routes.
- (6) OHV use to access camping sites is limited within 300 feet of existing roads and vehicle routes.

### **Paleontology (and Geological) Resources Management Objectives and Actions**

#### **Objectives:**

- (1) Develop, maintain, and encourage opportunities for scientific research of paleontological resources;
- (2) Provide educational opportunities and public outreach programs; and
- (3) Develop and maintain interpretation of paleontological resources in areas of high public interest and access.

#### **Actions:**

- (1) Paleontological resources will be managed to protect their important scientific values. Area closures, restrictions, or other mitigation requirements for the protection of paleontological values will be determined on a case-by-case basis.
- (2) Collecting of scientifically significant vertebrate fossils by qualified paleontologists is allowed by permit only.
- (3) Collection of fossils from public lands is allowed with some restrictions, depending on the significance of the fossils. Hobby collection of common invertebrate or plant fossils by the public is allowed in reasonable quantities using hand tools.

#### **Additional Management Opportunities:**

- (1) Use cave mapping to inventory graffiti and/or vandalism to cave formations.
- (2) Increase public awareness of appropriate cave etiquette through use of visitor permitting system.
- (3) Monitor resource conditions at regular intervals.
- (4) Support volunteer projects for cave restoration, if warranted (USDI-BLM, 2009b)

### **Recreation and Visitor Services Objectives and Actions**

#### **Objectives:**

- (1) Provide for the health and safety of visitors;
- (2) Prevent or mitigate resource damage resulting from recreation use;
- (3) Coordinate with other programs to minimize conflicts and adverse impacts on recreational opportunities;
- (4) Retain the quality of dispersed recreation opportunities and settings while meeting other recreation objectives;
- (5) Provide public education regarding appropriate uses of the BLM lands (such as the Cave Creek Cave ACEC); and
- (6) Provide opportunities for public use, interpretation, education, and appreciation of natural and cultural resources.

#### **Actions:**

- (1) The Cave Creek Cave ACEC area is open to dispersed recreation.

#### **Additional Management Opportunities:**

- (1) To maintain the ecosystem and the recreational opportunity, the BLM will maintain a locked gate and will identify specific group sizes that can explore the cave at one time. The BLM may implement a permitting system to maintain proper visitor use numbers.
- (2) Use visitation monitoring data to monitor resource conditions and quality of visitor experiences and determine necessary changes if required.
- (3) Develop a "Search & Rescue" Plan for visitor safety. The plan is attached in **Appendix C: Search & Rescue Plan for Cave Creek Cave**.
- (4) Provide interpretive and public education materials about cave life (USDI-BLM, 2009b). The signage that the BLM will plan on creating for this site will be low maintenance.
- (5) When entering caves inhabited by bats, encourage users to reduce disturbance by minimizing noise; use only red lights and those powered by batteries or cold chemicals (such as cyalume); and avoid bright flashlights and carbide lamps. Avoid smoking and passing too closely to, or lingering near roosting bats.
- (6) Do not use firearms, fireworks, open fires (including campfires, matches, and candles), camp

stoves, or toxicants inside caves or near the opening (WGFD 2011).

- (7) The access road that crosses the ACEC area is a small two-track that should not be maintained. The road helps create the backcountry experience for users.

**White-nose Syndrome (see Biological Resources Management Objectives and Actions above) with reference to recreationists:**

- (1) Take care to avoid cross-contamination within, and among, caves. Thoroughly scrape off any dirt from clothing, boots, and equipment upon leaving a cave. Seal all items in a plastic bag until they can be cleaned and disinfected. Decontaminate all clothing, footwear, and gear with bleach or professional antibacterial cleaner between every cave visit. Do not take gear into a cave that cannot be fully decontaminated.
- (2) Establish educational programs and use signs and other interpretive media to inform the public about the threat of WNS to bat populations and the importance of proper decontamination between cave visits.
- (3) Report unusual behavior, such as daytime flight, especially during cold weather, and dead or dying bats found on the ground, or in trees or buildings to the WGFD (WGFD 2011).

**Transportation and Access Objectives and Actions**

**Objectives:**

- (1) Maintain or expand, as determined necessary, existing access;
- (2) Abandon or close redundant or unnecessary access roads, reclaim after consultation with state or local government and interested parties;
- (3) Conduct transportation planning to manage existing and new access in a manner that ensures compatibility with resource values and management objectives; and
- (4) Incorporate existing state and county road systems into the BLM transportation system to accurately show existing access. Coordinate access issues with state and local governments.

**Actions:**

- (1) The public land transportation system will be maintained or modified to provide for public health and safety and adequate access to public lands.

- (2) Routing and construction standards will be adjusted based on route analysis and engineering design.
- (3) Consistent with the Wyoming BLM access policy, opportunities to acquire or maintain legal access will be pursued.
- (4) Consolidation of public lands (adjacent to the Cave Creek cave ACEC) will be pursued, when opportunities exist, to meet recreational demand.
- (5) BLM road signs will be installed to assist the public in locating the cave.

**Visual Resource Objectives and Actions**

**Objectives:**

- (1) Maintain the overall integrity of VRM classes while allowing for development of existing and future uses; and
- (2) Management actions listed below for the Cave Creek Cave must comply with the VRM Class II designation for the area, in accordance with the RFO RMP. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low.

**Actions:**

- (1) Management activities may be seen, but should not attract the attention of the casual observer. Surface disturbing activities will be prohibited unless or until an acceptable plan for mitigation of anticipated impacts has been agreed upon. In addition, any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

**Water Quality, Watershed, and Soils Resource Objectives and Actions**

**Objectives:**

- (1) Maintain or improve water quality by managing surface land use and groundwater resources, where practical and within the scope of the BLM's authority, according to the State of Wyoming Water Quality Rules and Regulations;
- (2) Maintain the hydrologic and water quality conditions needed to support riparian/wetland areas; minimize flood and sediment damage to water resources from human and natural causes; analyze, and where possible, minimize levels of salt loading in watersheds; and protect water resources

used by the public and by federal, state, and local agencies for fisheries, wildlife, livestock, and recreational uses; and

- (3) Address all accidental spills of environmental pollutants on federal lands within the ACEC.

#### **Actions:**

- (1) Surface disturbing activities will be avoided in identified 100-year floodplains, in areas within 500 feet of perennial waters, springs, and riparian areas, as well as areas within 100-feet of the inner gorge of ephemeral streams.
- (2) The historic water diversion is located near the existing two-track by the cave (see Figure 2). The two-track that crosses the diversion ditch should be blocked to reduce damage to the area and prevent vehicles from accessing the area directly next to the cave entrance. The use of large boulders in front of the water diversion would effectively stop vehicles from crossing the diversion.
- (3) Rehabilitate or reclaim reservoirs and other water sources within the BLM's authority that are functionally compromised and provide new water sources designed in support of resource management goals (Cave Creek Cave required humidity and temperature levels). Coordinate with local entities during planning and implementation of water source improvements (especially since the cave requires a specific amount of water to maintain appropriate humidity and temperature levels).

#### **Additional Management Opportunities:**

- (1) Protect and maintain surface water resources to provide a source of water for bats and increase insect production and foraging habitat (WGFD 2011).
- (2) Place large boulders/rocks in front of the two-track that crosses the man-made water diversion (made in the 1950s) to prevent vehicle traffic from crossing the water diversion and parking next to the cave entrance.
- (3) It is important that the abiotic factors (air flow, temperatures, and humidity levels) and hydrologic cycles within the cave system remain within the natural, long-term variation. Vegetation manipulation, road building, and/or other surface disturbing activities within the immediate vicinity of the cave could potentially affect these abiotic factors depending on the extent and location of any project in relation to the cave system (USDI-BLM, 1995).
- (4) Retain and restore the natural features of riparian areas within the Shirley Mountains ecosystem,

such as Cave Creek, Austin Creek, South Fork of Sage Creek, North and South Fork of Quealy Creek, and Austin Creek, to promote high insect diversity and enhance bat foraging opportunities.

- (5) Where possible create large artificial ponds. Repair old earthen stock ponds (see Figure 2) rather than replace them with metal tanks which are less accessible to bats.

#### **Additional Management Opportunities for Soils :**

- (1) Protect the cave environment by maintaining the vegetation (and associated soils) above Cave Creek Cave to avoid altering the internal climate and light levels, to avoid reducing insect populations in the immediate area, and to remove visual barriers (trees, bushes, other vegetation) (WGFD 2011). These attributes are all required to keep the cave ecosystem at its present humidity and temperature, especially to protect bat species inhabiting the cave.

#### **Wildlife and Fisheries Resources Management Objectives and Actions**

##### **Objectives:**

- (1) Maintain, restore, or enhance wildlife habitat in coordination and consultation with other local, state, and federal agencies and consistent with other agency plans, policies, and agreements. A full range of mitigation options will be considered when developing mitigation for project-level activities for wildlife and Special Status Species habitats;
- (2) Maintain, restore, or enhance T&E species habitat, in coordination and consultation with the USFWS and other local, state, and federal agencies and consistent with other agency plans, policies, and agreements; and
- (3) Maintain, restore, or enhance designated State Sensitive Species habitat to prevent listing under the ESA, in coordination and consultation with other local, state, and federal agencies and consistent with other agency plans, policies, and agreements.

##### **Actions:**

- (1) Seasonal closure of the Cave Creek Cave gate to human occupancy will occur from October 15 through April 30 for the protection of the bat hibernaculum.
- (2) Surface disturbing and disruptive activities located within the identified 100-year floodplain, within

500-feet of perennial waters, springs, wells, and wetlands and within 100-feet of the inner gorge of ephemeral channels will be intensively managed (USDI-BLM, 2008).

- (3) Wildlife habitat objectives will be considered in all reclamation activity.
- (4) Surface disturbing and disruptive activities potentially disruptive to nesting raptors are prohibited (see the RFO RMP) during species-specified time periods and within species-specified distances. In addition, surface structures requiring a repeated human presence will not be allowed within 825-feet (1,200 feet for ferruginous hawks) of active raptor nests.
- (5) Surface disturbing and disruptive activities will be intensively managed and Best Management Practices (BMPs) implemented to maintain or enhance upland game bird species, neo-tropical, and other migratory bird species, and their habitats.
- (6) Surface disturbing and disruptive activities will be intensively managed (BMPs) to maintain or enhance reptile and amphibian species and their habitats.
- (7) Informal conferencing and consultation with the USFWS will occur for authorized activities that would potentially affect the habitat for endangered, threatened, proposed, and candidate species within the Cave Creek Cave ACEC. Habitat and species conservation measures for these species will be applied to all surface disturbing and disruptive activities.
- (8) Surface disturbing and disruptive activities that would potentially affect the habitat of Special Status Species will be intensively managed on a case-by-case basis. These activities will also be managed to minimize impacts on identified crucial habitat for sensitive species for the purpose of protecting these species and their associated habitats.

#### **Additional Management Opportunities:**

- (1) Conduct systematic biological inventories to identify cave flora and fauna.
- (2) Install bat counters, if warranted
- (3) Systematically monitor bat populations to determine species present, patterns of use, and habitat conditions.
  - (a) Establish baseline data.
  - (b) Develop monitoring protocols and schedules for monitoring cave resources.

- (4) Systematically monitor aquatic populations (insects and fish) to determine species present, patterns of use, and habitat conditions.
  - (a) Establish baseline data.
  - (b) Develop monitoring protocols and schedules for monitoring cave resources.
- (5) Restore quality of bat habitat, if warranted.
- (6) Maintain the bat-friendly locking gate for protection of bats during critical time periods. Management of the cave to maximize the potential bat use should include maintenance of the gate so that the number of recreationists and season of use can be regulated.
- (7) Manage visitation through a permit system. It is recommended that summer and fall entry (between May 1 and October 14) be restricted to one party of no more than six persons per week and that all parties receive training on cave etiquette for caves occupied by roosting bats. In addition, Grottos should be contacted to inform them of the new management guidelines and to solicit their support and assistance in enforcement (Priday et al, 1996).
- (8) Using monitoring data (both bat population/use and public use) to manage visitation to reduce impacts on bat populations and habitat, if warranted.
- (9) Provide interpretive and public education materials about cave flora and fauna. Signs can be used to inform the public about how activities in Cave Creek Cave can threaten bats, and how caving can be enjoyed without affecting bats (such as caving in early spring and fall when human presence and activity is least likely to disturb bats) (WGFD 2011).
- (10) Identify research needs and protocols to ensure that all studies are conducted in a manner that does not impact cave values and life forms.
  - (a) Identify protocols for evaluating and issuing research permits.
  - (b) Identify research needs to help in the management of the cave.
  - (c) Establish partnerships and funding opportunities to conduct appropriate research projects (USDI-BLM, 2009b).
- (11) Implement a de-contamination protocol to reduce diseases (e.g., white nose syndrome [WNS]) and other pathogens to bats from human use.

**White-nose Syndrome**

(1) Take care to avoid cross-contamination within, and among, caves. Thoroughly scrape off any dirt from clothing, boots, and equipment upon leaving a cave. Seal all items in a plastic bag until they can be cleaned and disinfected. Decontaminate all clothing, footwear, and gear with bleach or professional antibacterial cleaner between every cave visit. Do not take gear into a cave that cannot be fully decontaminated.

- (2) Establish educational programs and use signs and other interpretive media to inform the public about the threat of WNS to bat populations and the importance of proper decontamination between cave visits.
- (3) Report unusual behavior to the WGFD, such as daytime flight, especially during cold weather, and dead or dying bats found on the ground, trees, or buildings (WGFD 2011).

**Persons/Agencies Consulted:**

Individual	Discipline	Organization
William Mack	Forester	BLM
Kelly Owens	Hydrologist	BLM
Patrick Walker	Archaeologist	BLM
Matt Simons	Realty Specialist	BLM
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Mark Newman	Geologist	BLM
Susan Foley	Weed and Soil Scientist	BLM
Noelle Glines-Bovio	Recreation Planner	BLM
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Date:

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## LIST OF ACRONYMS

BLM	Bureau of Land Management
BMPs	Best Management Practices
CFR	Code of Federal Regulations
FCRPA	Federal Cave Resources Protection Act of 1988
FLPMA	Federal Land Policy and Management Act (1976)
LNT	Leave No Trace
NEPA	National Environmental Policy Act (1969)
NSS	National Speleological Society
OHV	Off-Highway Vehicle
RFO RMP	Rawlins Field Office’s Record of Decision and Approved Rawlins Resource Management Plan
RUP	Recreation Use Permit
SAR	Search and Rescue
Sensitive Species	BLM Wyoming State Sensitive Species
T&E species	Threatened, Endangered, Proposed and Candidate Species
USFWS	United States Fish and Wildlife Service
VRM	Visual Resources Management

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## APPENDIX A1-A4: Plant and Animal Species & Habitats within the Shirley Mountain Ecosystem (including the Cave Creek Cave ACEC)

### APPENDIX A-1: Plant Species Located in the Cave Creek Cave ACEC

<b><i>Understory Forb Component Species</i></b>			
buckwheat	larkspur	lupine	paintbrush
sandwort	mulesear	penstemons	yarrow(s)
Oregon grape			
<b><i>Grass Species</i></b>			
green needlegrass	Columbia needlegrass	elk sedge	mountain brome
Idaho fescue	king-spike fescue	Kentucky bluegrass	big bluegrass
slender wheatgrass	thickspike wheatgrass	bluebunch wheatgrass	western wheatgrass
<b><i>Mountain Shrub Species</i></b>			
serviceberry	antelope bitterbrush	mountain mahogany	chokecherry
rose			
<b><i>Weed Species</i></b>			
alyssum	Other mustards		

### APPENDIX A-2: Common Wildlife Species Inhabiting and/or Migrating through the Shirley Mountain Ecosystem (including the Cave Creek Cave ACEC) (USDI-BLM 1995)

<b><i>Mammal Species</i></b>			
Masked shrew	Wyoming ground squirrel	Prairie vole	Ermine
Water shrew	Golden-mantled ground squirrel	Sagebrush vole	Long-tailed weasel
Dwarf shrew	Thirteen-lined ground squirrel	Muskrat	Mink
Western small-footed myotis	Fox squirrel	Norway rat	Badger
Little brown myotis	Red squirrel	House mouse	Western spotted skunk
Long-legged myotis	Southern red-backed vole	Western jumping mouse	Eastern spotted skunk
Silver-haired bat	Long-tailed vole	Plains pocket mouse	Striped skunk
Big brown bat	Northern pocket gopher	Porcupine	Mountain lion
Hoary bat	Marten	Coyote	River otter
Desert cottontail	Ord's kangaroo rat	Red fox	Bobcat
Black-tailed jackrabbit	Beaver	Norway rat	Elk
White-tailed jackrabbit	Deer mouse	Gray fox	Mule deer
Yellow-pine chipmunk	Northern grasshopper mouse	Black bear	White-tailed deer
Least Chipmunk	Bushy-tailed woodrat	Raccoon	Moose
Yellow-bellied marmot	Montane vole		
<b><i>Fish Species</i></b>			
None			
<b><i>Amphibian Species</i></b>			
Tiger salamander	Boreal chorus frog		
<b><i>Reptile Species</i></b>			
Northern sagebrush lizard	Bullsnake	Wandering garter snake	Prairie rattlesnake
<b><i>Bird Species</i></b>			
Turkey vulture	Olive-sided flycatcher	Gray catbird	Luzuli bunting
Black-shouldered kite	Western wood-pewee	Northern mockingbird	Indigo bunting
Northern harrier	Eastern wood-pewee	Western grebe	Dickcissel
Red-tailed hawk	Willow flycatcher	Clark's grebe	Green-tailed towhee
Sharp-shinned hawk	Western flycatcher	Brown thrasher	Rufous-sided towhee
Cooper's hawk	Least flycatcher	American pipit	American bittern

## APPENDIX A-2: Common Wildlife Species Inhabiting and/or Migrating through the Shirley Mountain Ecosystem (including the Cave Creek Cave ACEC) (USDI-BLM 1995) (con't)

### Bird Species (con't)

Broad-winged hawk	Hammond's flycatcher	Sprague's pipit	American tree sparrow
Swainson's hawk	Dusky flycatcher	Bohemian waxwing	Chipping sparrow
Rough-legged hawk	Gray flycatcher	Cedar waxwing	Clay-colored sparrow
Common loon	Ash-throated flycatcher	Northern shrike	Field sparrow
Golden eagle	Cordilleran flycatcher	European starling	Vesper sparrow
American kestrel	Eastern phoebe	Solitary vireo	Lark sparrow
Gray partridge	Say's phoebe	Yellow-throated vireo	Lark bunting
Chukar	Western kingbird	Warbling vireo	Savannah sparrow
Blue grouse	Eastern kingbird	Philadelphia vireo	Grasshopper sparrow
Sage grouse	Scissor-tailed flycatcher	Red-eyed vireo	Song sparrow
Virginia rail	Horned lark	Golden-winged vireo	Lincoln's sparrow
Sora	Tree swallow	Tennessee warbler	White-throated sparrow
American coot	Violet-green swallow	Orange-crowned warbler	Harris' sparrow
Black-bellied plover	Northern rough-winged swallow	Nashville warbler	Fox sparrow
Lesser golden-plover	Bank swallow	Virginia's warbler	White-crowned sparrow
Snowy plover	Cliff swallow	Northern parula	Dark-eyed junco
Semi-palmated plover	Barn swallow	Yellow warbler	McCown's longspur
Killdeer	Gray jay	Chestnut-sided warbler	Lapland longspur
Willet	Steller's jay	Magnolia warbler	Chestnut collared longspur
Spotted sandpiper	Blue jay	Black-throated warbler	Snow bunting
Upland sandpiper	Scrub jay	Snowy egret	Black-crowned night heron
Whimbrel	Pinyon jay	Yellow-rumped warbler	Bobolink
Warbled godwit	Clark's nutcracker	Black-throated gray warbler	Red-winged blackbird
Common snipe	Black-billed magpie	Townsend's warbler	Western meadowlark
Franklin's gull	American crow	Black-throated green warbler	Yellow-headed blackbird
Rock dove	Common raven	Blackburnian warbler	Rusty blackbird
Band-tailed pigeon	Black-capped chickadee	Yellow-throated warbler	Brewer's blackbird
White-winged dove	Mountain chickadee	Pine warbler	Common grackle
Mourning dove	Red-breasted nuthatch	Balm warbler	Brown-headed cowbird
Black-billed cuckoo	White-breasted nuthatch	Bay-breasted warbler	Orchard oriole
Barn owl	Pygmy nuthatch	Blackpoll warbler	Northern oriole
Eastern screech-owl	Brown creeper	Black-and-white warbler	Rosy finch
Great horned owl	Rock wren	American redstart	Pine grosbeak
Snowy owl	Canyon wren	Prothonotary warbler	Cassin's finch
Long-eared owl	Bewick's wren	Worm-eating warbler	House finch
Short-eared owl	House wren	Ovenbird	Red crossbill
Northern saw-whet owl	Marsh wren	Northern waterthrush	White-winged crossbill
Common nighthawk	American dipper	Kentucky warbler	Hoary redpoll
Common poorwill	Golden-crowned kinglet	MacGillivray's warbler	Common redpoll
Chimney swift	Ruby-crowned kinglet	Common yellowthroat	Pine siskin
White-throated swift	Blue-gray gnatcatcher	Hooded warbler	Lesser goldfinch
Calliope hummingbird	Eastern bluebird	Wilson's warbler	American goldfinch
Broad-tailed hummingbird	Western bluebird	Canada warbler	House sparrow
Rufous hummingbird	Mountain bluebird	Yellow-breasted chat	Varied thrush
Belted kingfisher	Townsend's solitaire	Hepatic tanager	Northern flicker
Red-headed woodpecker	Veery	Summer tanager	Black tern
Red-naped sapsucker	Swainson's thrush	Western tanager	Caspian tern
Downy woodpecker	Hermit thrush	Northern cardinal	Blue grosbeak
Hairy woodpecker	Wood thrush	Rose-breasted grosbeak	Evening grosbeak
Three-toed woodpecker	American robin	Black-headed grosbeak	Black-backed woodpecker
Lewis' woodpecker			

### APPENDIX A-3: Endangered, Threatened, Proposed, and/or Candidate Wildlife & Plant Species within the Rawlins Field Office, but That Are Not Located Within the Cave Creek Cave ACEC

<b>Mammal Species</b>			
Canada lynx	Black-footed ferret		
<b>Fish Species</b>			
None			
<b>Amphibian Species</b>			
Wyoming toad			
<b>Reptile Species</b>			
Northern sagebrush lizard	Bullsnake	Wandering garter snake	Prairie rattlesnake
<b>Bird Species</b>			
Yellow-billed cuckoo	Greater sage-grouse		
<b>Plant Species</b>			
Blowout penstemon plant & Critical Habitat	Ute ladies'-tresses plant	Colorado butterfly plant & Critical Habitat	
<b>Colorado River System Depletion</b>			
None			
<b>Platte River System depletion</b>			
None			

### APPENDIX A-4: BLM Wyoming State Sensitive Species Located within the Rawlins Field Office; those in the ACEC Are Highlighted

<b>Mammal Species</b>			
long-eared myotis	fringed myotis	spotted bat	Townsend's big-eared bat
Wyoming pocket gopher	pygmy rabbit	swift fox	Preble's meadow jumping mouse
<b>Fish Species</b>			
Colorado River cutthroat trout	roundtail chub	flannelmouth sucker	bluehead sucker
hornyhead chub			
<b>Amphibian Species</b>			
northern leopard frog	chorus frog	Western boreal toad	Great Basin spadefoot
<b>Reptile Species</b>			
None			
<b>Raptor Species</b>			
Northern goshawk	bald eagle	ferruginous hawk	peregrine falcon
burrowing owl			
<b>Bird Species</b>			
sage thrasher	Brewer's sparrow	sage sparrow	Columbian sharp-tailed grouse
loggerhead shrike	Baird's sparrow	white-faced ibis	trumpeter swan
long-billed curlew			
<b>Plant Species</b>			
Laramie false sagebrush	limber pine	many-stemmed spider flower	Laramie columbine
Trelease's racemouse milkvetch	Cedar Rim thistle	Weber's scarlet-gilia	Gibben's beardtongue
persistent sepal yellowcress	Rocky Mountain twinpod		

## APPENDIX B – Relative Humidity, Air Flow, and Temperature Measurements for Cave Creek Cave

Observer	Date	Location	Time	RH	Air Flow	Temp
John Gookin	6/20/1992	The Crossroads	11:15	86%		(4.2°C)
		Historic Hall	11:45	90%		(5.5°C)
		The Sump	13:20	91%		(7.3°C)
John Priday & Bob Luce	8/16/1994	Entrance	20:30	90%		50°F (9.9°C)
		100' (30.5m)		92%		49°F (9.4°C)
John Priday & Bob Luce	12/13/1995	25' (7.6m)		73%		41°F (5.0°C)
		100' (30.5m)		91%		38°F (3.3°C)
		History Hall		92%-94%		41-45°F (5.0-7.2°C)
BLM: Read et al	8/3/1994	Outside entrance near fire pit	19:45		<3 mph	65°F
	8/8/1994		19:45		3-5 mph	60°F
	8/9/1994		21:25		<3mph	73°F
	8/10/1994		20:30		<3 mph	60°F
	8/11/1994		20:30		<3 mph	70°F

## APPENDIX C – Search & Rescue Plan for Cave Creek Cave

Although the cave has several tunnels, it is small enough that it would be relatively easy to find a missing person. Because of small passages, a SKED® litter with long haul lines would be required to extract a patient from anywhere in the cave. A SKED® is a compact, lightweight transport system used to transport a casualty over land, in the water, and/or airlift the casualty. Any litter rescues from behind Historic Hall would require strong teams to deal with the long chimney traverses. The rescue team should take a large supply of 2x2's and 2x4's to use as stemples and supports to slide the litter in these traverses; there are hundreds of feet of these traverses. The cave is a cold wet cave and hypothermia would set in quickly in an injured person. There is a major constriction at the sump (-68.4') that even a SKED won't fit through; wet suits would be needed to pass the sump. There are very few hazards in the cave and the greatest accident is having a person get wedged in a chimney (Gookin, 1992)