THE CAVE CONSERVATIONIST

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***The Cave Conservation and Management Section of the NSS***

# Interior Department's Inspector General: Public Health and Safety at Risk from Abandoned Mines

Excerpts from Audit Report issued by Office of Inspector General, U.S. Department of Interior, July 2008:

**Results in Brief**

We are gravely concerned that the Department of the Interior (DOI or Department) has put the public's health and safety at risk by not addressing hazards posed by abandoned mines on federal lands. Mines located primarily in the western states of California, Arizona, and Nevada have dangerously dilapidated structures, serious environmental hazards, and gaping cavities – some capable of swallowing an entire vehicle.

During our audit, we identified serious environmental and safety hazards where members of the public had been killed, injured, or exposed to dangerous environmental contaminants. A number of adults and children have fallen to their deaths over the past several decades due to hazards associated with abandoned mines. The potential for more deaths and injuries is ominous. Growth of the population and use of off-road vehicles in the West will increase the likelihood of additional deaths or injuries.

We focused out audit on abandoned mines on Bureau of Land Management (BLM) and National Park Service (NPS) lands because the majority of abandoned mines are located there. We visited approximately 45 areas with abandoned mines from March 2007 through April 2008 and talked to over 75 employees from 13 BLM offices and 5 national parks.

At several BLM sites we visited, we found dangerous levels of environmental contaminants, such as arsenic, lead, and mercury – easily accessible to visitors and local residents, often without their knowledge. We also found instances of trespassing at abandoned BLM mine sites, including residential and commercial development on the land.

Even more disturbing, we found that BLM supervisors told staff to ignore these problems, and employees were criticized or received threats of retaliation for identifying contaminated sites. One employee stated that adding additional sites to an inventory list and declaring them unsafe was more detrimental to BLM because doing so acknowledged a hazard and a potential liability.

While BLM has the clear majority of abandoned mine sites on DOI lands, we found that it has an ineffective program to address them. BLM's abandoned mines program has long been undermined, neglected, and marginalized by poor management practices and insufficient staffing and resources.

We found that NPS has mitigated many of its high-risk, easily accessible abandoned mine sites; however, there are hundreds, if not thousands, of sites that still need to be addressed. At one park, the abandoned mine inventory includes over 600 sites, and NPS officials have inspected less than half of the sites on the 1.4 million acres comprising the park. While NPS has a more effective program, current funding for NPS' abandoned mine program is inadequate to address these hazards, and NPS has failed to develop a credible estimate of the total cost of mitigation.

*(Continued on page 4)*

**Cave Conservation and Management Section of the National Speleological Society**

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Abandoned mines and caves in the West: http://www.mojaveunderground.com/

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## INSIDE PAGE

# FWS Releases Comprehensive Conservation Plan for Logan Cave National Wildlife Refuge

Selected excerpts from *Federal Register*, Sept. 10, 2008, daily ed. pp. 52668-70:

### Introduction

With this notice, we finalize the CCP [(Comprehensive Conservation Plan)] process for Logan Cave National Wildlife Refuge.

Logan Cave National Wildlife Refuge was established in 1989 under the Endangered Species Act of 1973 to protect cave inhabitants, including the endangered gray bat (*Myotis grisescens*), Benton cave crayfish (*Cambarus aculabrum*), and the threatened Ozark cavefish (*Amblyopsis rosae*). The cave also has historically provided habitat for the endangered Indiana bat (*Myotis sodalis*). This 123-acre Ozark Mountain refuge, which includes a limestone solution cave with approximately 1.5 miles of passageways, is located 20 miles west of Fayetteville, Arkansas, and approximately 2 miles north of U.S. Highway 412.

Groundwater surfacing within the cave forms a stream that flows throughout the cave and at the outfall forms Logan Spring, which drains to Osage Creek just south of the refuge. Osage Creek is a major tributary of the Illinois River, which is the main drainage in southwestern Benton County, and their confluence is about 1.2 miles south of the refuge. In past years, spring water from the cave had a measured flow of approximately 5 million gallons per day and supplied the Logan community, a fish hatchery, and 49 fish ponds.

### Selected Alternative

We developed three alternatives for management of the refuge and chose Alternative 3 as the preferred alternative.

The primary focus under this alternative will be to add a staff person and equipment in order to manage, maintain, restore, and protect the refuge's habitats and wildlife species. Wildlife and plant censuses and inventory activities will be initiated and maintained to obtain the biological information needed to continue current refuge management programs and implement crucial management programs on and off the refuge.

Active habitat management will be implemented to maintain and enhance water quality and quantity within the cave system, the recharge zone (groundwater recharge areas), and waterways within the bat foraging areas through best management practices, easements, and partnerships with private landowners and other federal and state agencies. Continuous groundwater quality monitoring is crucial to the existence of the aquatic species utilizing the cave stream and groundwater corridors.

The Benton cave crayfish and Ozark Cavefish populations will be maintained at a minimum of 35 and 40 individuals, respectively. A properly trained survey team (no more than 4 observers) will perform ocular surveys bi-annually in January or February. During these surveys, the occurrence of any Indiana bats will be noted. The refuge will study the micro-climate of the cave to determine suitability for Indiana bats. Gray bats will be counted annually during July by exit counts. At least two trained persons will count bats at the same time on the same evening as the bats emerge from the spring and sinkhole entrances. Bat guano will be measured each year as soon as possible after the maternity colony has left the cave. No more than three persons will conduct guano measurements and this will be done in conjunction with the crayfish/cavefish surveys when possible. The refuge will maintain all other populations of karst species, such as pseudoscorpions, isopods, amphipods, beetles, collembolans, and other blind insects, adapted to subterranean habitats. The abundance of the grotto salamander will also be monitored.

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See the full *Federal Register* notice at http://frwebgate4.access.gpo.gov/cgi-bin/PDFgate.cgi?WAISdocID=074156437849+0+2+0&WAISaction=retrieve

# Abandoned Mines Report: Mine Cleanup Urgent, Could Be Costly
## (continued from page 1)

We believe that working in consort, BLM and NPS would make greater strides toward a solution for abandoned mines than doing so independently. The agencies should explore opportunities to share resources, expertise, and best practices to improve their programs.

While the expense of cleaning up abandoned mine sites is a concern, with figures estimated in the billions, we believe simple precautions can easily be taken at the most dangerous sites, including posting warning signs and building fences. At environmentally-contaminated sites, staff can reduce air and water-borne contamination through dust control with sprinklers and temporary covers.

The overall solution for cleaning up abandoned mines is not simple. It calls for a complex and concerted effort on the part of the Department, including the immediate mitigation of known hazardous sites, a calculated effort to identify and inventory unknown sites, a methodical design to address abandoned mines comprehensively, and a strategy to secure the necessary funding for this costly endeavor.

The findings for this audit paint a picture of compelling urgency, which should trigger a swift call to action by both the Department and Congress. We are providing recommendations designed to help develop a comprehensive solution to this multi-faceted problem, not of DOI's making, but now, certainly, in the Department's realm of responsibility.

**Background**

Since the 1850s, mining of hard rock elements such as gold, silver, copper, and lead has been an important part of the economy of the Western United States. Congress passed the General Mining Law of 1872, which established a process to allow individuals to explore, claim, and mine public lands containing mineral deposits. The General Mining Law required little mitigation of physical and environmental hazards created by mining activities. In 1976, Congress passed the Federal Land Policy Management Act that enhanced federal management of mining activity and its safety and environmental effects. However, historical mining activity left hundreds of thousands of abandoned mine sites.

Within DOI, the majority of abandoned mine sites are located on lands managed by BLM, primarily in Arizona, Nevada, and California. Typically, no mining operations have been conducted at these sites for many years, although valid mining claims may still exist. The vast majority of abandoned mine sites on NPS lands are located in the California desert area of the Pacific West Region. The California desert area, specifically Death Valley National Park, Mojave National Preserve, and Joshua Tree National Park, contains most of the mine hazards on NPS land.

Many abandoned mine sites present an immediate danger of physical injury or death due to open vertical shafts and horizontal adits (entrances to a mine) and mill sites with deteriorating buildings and equipment. Dangers include deadly gases and asphyxiation, collapsing mine walls, explosive and toxic chemicals, and rotting structures. Physical hazards require the least funding to fix or mitigate and the least expertise to identify and evaluate. Mitigation can range from temporary measures including fencing and signs to more costly permanent measures, including steel and concrete covers. The only permanent mitigation action is to fill in shafts and adits and demolish or remove buildings and structures.

Some sites also present long-term dangers to people from exposure to piles of waste rock or mine tailings (mine waste) containing hazardous materials such as arsenic, lead, and mercury. These sites can cost hundreds of millions of dollars to remediate and require

*(Continued on page 5)*

# Abandoned Mines Report
## (continued from page 4)

extensive expertise to identify, evaluate, and mitigate. Potential sites must be sampled to identify hazardous contamination. Mitigation can include temporary measures such as reducing air and water-borne contamination through dust control with sprinklers and temporary covers. Other temporary measures that can be taken to protect the public at these sites include installing fencing and signs and taking appropriate steps to notify the public of the dangers. Permanent mitigation can include reprocessing of mine tailings to treat contaminants, removal of materials to safer locations, or onsite disposal in a properly designed facility. Clean-up of all significant sites with environmental hazards will cost billions of dollars.

**Injuries and Deaths**

Comprehensive records of abandoned mine accidents are not maintained by DOI or its bureaus. However, physical safety hazards continue to result in visitor injuries and deaths. The U.S. Mine Safety and Health Administration identified 33 abandoned mine fatalities between 1999 and 2007 on all public and private lands in the United States. We performed a limited search of accident records and found that between 2004 and 2007, at least 12 people were killed in accidents at abandoned mines. We also visited six abandoned mines on BLM and NPS lands where deaths had occurred since 1984.

At the Keane Wonder mine in Death Valley National Park, CA, a visitor fell 30 feet down a mine shaft in 1984 and died of massive head injuries. We found that NPS' visitor literature advertised the abandoned site and NPS had signs directing visitors to the area, which had a visitor parking lot. We also found that other mine openings in Death Valley National Park were easily accessible by visitors using park roads and trails. After the death at Keane Wonder, NPS did install a steel net across the opening, but during our visit, we noticed that the net had been vandalized and other nearby openings had no fences or signs.

In 1991, a visitor to the Goat Basin Mine, Barstow Field Office, CA, bypassed a fence around an open mine shaft and attempted to lower himself into the shaft using chains attached to the bumper of his truck. The chains slipped and he fell 200 feet to his death. This type of site is commonly called an "ant trap" because it has steeply sloping sides that prevent escape if a person begins to slide into the shaft. After the accident, BLM did install a barbed wire fence around the shaft; however, during our site visit, we saw only remnants of the fence and no warning signs. This site was not on BLM's abandoned mine inventory and was not effectively mitigated. According to a BLM official, there are many such openings in the area but BLM has not inventoried these sites and has no plans to mitigate the hazards. After our site visit, we made recommendations to BLM about the safety concerns at the Goat Basin Mine, and BLM took immediate action and erected a fence around the opening.

In 1996, at the American Flat Mill near Virginia City, NV, a teenager died while climbing stairs on his all-terrain vehicle inside the structure. This extremely dangerous, dilapidated structure, which was built in the 1920s, is easily accessible with few fences and is a popular hang-out site for teens. While not documented, a BLM official told us that many other serious injuries have occurred at the site requiring flight-for-life helicopter rescues. BLM has not permanently mitigated the site because of concerns about the mill's "historical value."

We found that in Virginia City, NV, a local high school teacher and a friend were killed in 1996 after entering the New Savage Mine. The men ignored a large "Keep Out-Bad Air" warning sign at the mine entrance, bypassed a fence, and were asphyxiated. The site was subsequently more permanently fenced and closed. The New Savage Mine is one of hundreds near Virginia City.

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Read the full report at
http://www.doioig.gov/upload/2008-G-00241.pdf

## Short Scoops . . .

The Nature Conservancy and Ijams Nature Center have collaborated on the installation of cave gates at a property located only about three miles from downtown Knoxville. An Aug. 29, 2008 press release from the Nature Conservancy explained that the Georgia Marble Quarry, currently being managed by the adjoining Ijams Nature Center, has a cave system underneath it. The system, which features underground streams, harbors a number of cave creatures, including the rare Berry cave salamander. The cave system's entrances now are protected by metal gates.

Wil Orndorff, a geologist with the Virginia Department of Conservation and Recreation, has been studying the Madison Cave isopod, and thinks that how well it thrives is an indicator of water quality. On Oct.15, 2008, the *Richmond Times-Dispatch* wrote that, according to Mr. Orndorff, the isopod is a sightless, pigment-less crustacean found only in 12 sites in the Shenandoah Valley and a small part of West Virginia. Millions of years ago, the Shenandoah Valley had one giant aquifer, but over time the aquifer was broken into blocks as rivers cut out their beds. Studies of the isopods and their genetic characteristics can provide information about how and where the aquifers are connected. Current indications, says Mr. Orndorff, are that there are three unique populations of isopods with small but distinct genetic differences, suggesting that some of the Shenandoah Valley aquifers are not connected.

Thanks to a new treatment lagoon system, the town of Spencer, Tennessee now has no need to pump treated water from its sewage treatment plant into a nearby river or into a creek that runs into Rumbling Falls Cave. An Oct. 24, 2008 story at *Tennessean.com* reported that cavers, among others, opposed a state decision to allow the new treatment plant to discharge the treated water into Dry Fork Creek, which flows into the cave. While the city temporarily discharged the water into the nearby Lick Branch, now the plant's discharges will go into a series of basins, which are designed to allow slow percolation of the water into the ground.

The Diggers, members of a group that explores subterranean Moscow, warn that Red Square and the Kremlin could sink into the earth at any moment due to large underground cracks. An Oct. 31, 2008 report by the Russian press agency *RIA Novosti* quoted the Diggers' leader as saying that the soil under the Square "already has begun to crumble." While there have been small-scale collapses in a number of areas around the capital in recent years, some sources observe that the Diggers have made apocalyptic predictions before.

The Nov. 1, 2008 *MySanAntonio.com* wrote that Jacob's Well, the Hill Country source of Wimberly's Cypress Creek, had stopped flowing for only the second time in recorded history. Suggested causes include ongoing drought, over-pumping of the Trinity Aquifer, and the spread of impervious cover. Jacob's Well gets its water from a cave that attracts scuba enthusiasts, several of whom have died there.

Steve Rush, the owner of Mystery Caverns, has put the property up for auction on eBay. A Nov. 3, 2008 story at *MercuryNews.com* reported that the property, near Harrison, Arkansas, contains two commercial caves plus a third that is too dangerous for tours. Although business has dropped since Mr. Rush began giving tours in 1992, the Mystic Caverns still get about 15,000 visitors annually. The bidding starts at $899,000.

According to the Nov. 7, 2008 *Science Daily*, examination of a stalagmite from a Chinese cave might have identified a reason behind the falls of three dynasties. Researchers from the University of Minnesota and Lanzhou University removed an 1800 year old stalagmite from Wanxiang Cave in Gansu Province, China. By measuring uranium and thorium in the various layers of the stalagmite, the researchers determined the ages of the layers. Analysis of oxygen isotopes then allowed the team to draw conclusions about amounts of rainfall on those dates. Among other findings: Periods of weak summer monsoons lined up with periods of popular unrest during the last years of the Tang, Yuan, and Ming dynasties.

# The Cave Conservationist



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