

NORTH AMERICAN BATS AND MINES PROJECT: A COOPERATIVE INTERAGENCY APPROACH TO BAT CONSERVATION THROUGH MINE LAND RECLAMATION¹

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Abstract: Human safety and liability concerns prompted a national campaign to close abandoned mines. These closures, along with renewed mining in historic districts, present a significant threat to mine-dwelling bat populations. Over half of North America's 45 bat species have been documented using abandoned underground mines. The need for mine habitat increases as traditional cave and tree hollow roosts disappear. Bats are a primary consumer of night flying insects, many of which cost farmers billions of dollars annually in crop damage. Likewise, if the role of some species as pollinators and seed dispersers is compromised, entire ecosystems could be imperiled. To prevent further losses of mine roosting bats during abandoned mine land reclamation, Bat Conservation International and the USDI-Bureau of Land Management created the North American Bats and Mines Project (NABMP). This proactive program focuses on education, provides national leadership, and coordinates partnerships with federal, state, and private agencies. To date, the project has involved federal and state mine-land and wildlife managers and the mining industry and has trained hundreds of mine-land and wildlife managers in mine assessment techniques for bats and bat-compatible closure methods. This collaboration with numerous federal, state, and private partners has resulted in the protection of some of the most important mine-roosting bat populations. Since the program's inception, more than two million mine roosting bats have been protected, hundreds of miles of mine passage have been preserved to allow the stabilization and growth of bat populations, and thousands of mines have been safeguarded from public entry. In addition, the mines offer tremendous opportunity for conservation-based research. Future cooperation will ensure the long-term protection of mine roosting bats.

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Introduction

Bats comprise approximately one-quarter of all mammal species in the world, yet they remain one of the least understood and most endangered groups of animals in North America. Bats play an essential role in many ecosystems as pollinators and seed dispersers and are primary predators of insects that cost farmers and foresters billions of dollars annually. Despite their importance, bats are often persecuted both intentionally and unintentionally, and they continue to decline from habitat loss, environmental toxins, and disturbance at key roost sites.

Over half of North America's 45 bat species have been documented roosting in abandoned underground mines. For some species, such as Townsend's big-eared bats (*Corynorhinus townsendii*), mines are crucial to their survival (Altenbach, 1995). Whether bats moved into these old mine workings because more traditional roosts such as caves and tree hollows were disappearing, or simply because these man-made structures were more numerous and offered suitable roosting conditions, mines have become important habitat for bats. Bats do not differentiate between man-made and "natural" when selecting roost sites—all roosts are habitat. Several abandoned iron and copper mines throughout the Great Lakes region house some of the largest bat populations in the United States. Closure of these abandoned mines without first evaluating their importance to bats is perhaps the single greatest threat to many North American bat species (Tuttle and Taylor, 1994).

Bat Conservation International (BCI) and the Department of Interior Bureau of Land Management (BLM) founded the North American Bats and Mines Project (NABMP) in 1993 to address conservation issues facing mine-roosting bats. The NABMP has four primary objectives: to educate the public on the importance of mines for bats; to train wildlife and mine-land managers on mine assessment and closure methods that protect both bats and people; to assist agencies and industry in protecting and enhancing bat roosts in abandoned mines; and to develop techniques to create new bat habitats during mine-land reclamation on federal and private lands.

The Importance of Mines to Bats

Throughout the United States, human alteration of caves, human disturbance of bats roosting in caves, cave commercialization, deforestation, and urban and agricultural developments have forced many bats from their traditional roost sites in search of new homes. As a result of the loss and disturbance of natural roosts, abandoned mines have become refuges of last resort for some bat species. Over the past 100 or more years, many bat species have gradually moved into abandoned mines, which often provide microclimates similar to caves.

On a mine per mine basis, bat usage can be variable and unpredictable, however on a larger scale approximately 50% of mines receive some use and in about 10% of these mines, the use is significant (Altenbach & Pierson, 1995). In one study, one-quarter of all abandoned mines surveyed in Utah were used as day roosting sites by Townsend's big-eared bat (*C. townsendii*), a species particularly dependant on mines. Again, this usage demonstrates that these mines represent an important resource that may be critical to the long-term viability of local populations (Sherwin et al, 2000). Other long-term studies in California have documented the dependence of some species on mines, such as California leaf-nosed bats, and have shown mine usage (bats or guano) as high as 80% in some places (Brown et al., 1989). In Kentucky and Tennessee, a 1983 U.S. Army Corps of Engineers survey of 114 mines found that 28% of the shafts contained bats (Belwood and Waugh, 1991). In fact, the largest known hibernating populations of the Southeastern big-eared bat (*Corynorhinus rafinesquii*) and the small-footed myotis (*Myotis leibii*) occur in mines in Tennessee and New York, respectively. Checking for the presence of bats is a critical step for the survival of several North American bat species.

Early abandoned mine reclamation practices did not recognize the significance of abandoned mines for bat habitat. With funds from the Surface Mining Control and Reclamation Act (SMCRA) started by Congress in 1977, abandoned mine land (AML) programs began to sprout. By 1980, many AML programs were started and the standard closure method was done by backfilling. The idea that abandoned mines were important to many bat species didn't begin to resonate with mine-land managers until the late 1980's/early 1990's (Milford, 2000). BCI's North American Bats and Mines Project was conceived at about this time to encourage

consideration of bats in abandoned mine land reclamation procedures.

The North American Bats and Mines Project

The NABMP began as a partnership between BCI and the BLM and was created to address the plight of mine-roosting bats. BCI has facilitated numerous bat conservation initiatives throughout the world, and the BLM manages nearly 270 million acres of public lands, which contain a large proportion of North America's abandoned mines. The Forest Service, Natural Resources Conservation Service, Fish and Wildlife Service, National Park Service and many state agencies are also participating in the project. Mining companies have been the newest addition for proactive, collaborative bat conservation efforts through our Mining for Habitat initiative.

The purpose of the NABMP is to eliminate the loss of bats during abandoned mine-land reclamation, while still protecting human safety. By establishing and achieving the following NABMP goals, BCI and its partners are ensuring that bat conservation measures are incorporated into the planning and operating procedures of agencies and organizations responsible for mine-land management and wildlife conservation.

Objective 1: Awareness, Education, and Training

___The NABMP raises awareness among key governmental agencies, private industry, and the public regarding the tremendous impact of mine closures on bats. In the fall of 1993, BCI and BLM collaborated on the first "Mine Assessment for Bats" workshop, training dozens of BLM land and wildlife managers from a multi-state region in mine assessment and protection techniques for bats. These workshops are still in high demand and continue to evolve as additional information is added to the bats and mines library. BCI has developed an interpretive display booth on the bats and mines issue, which is being exhibited at key wildlife and mining conferences across North America. The display, along with technical paper presentations, exposes thousands of mine-land and wildlife managers to the bats and mines issue. In addition to technical presentation, the bats and mines project director continues to give presentations at

community groups and schools throughout North America.

The NABMP trains wildlife and mine-land managers in mine assessment techniques for bats to ensure that they obtain the knowledge and skills necessary to identify, prioritize, and protect key bat roost sites. In 1997, BCI and its agency partners updated the Bats and Mines Resource Publication. This informative document summarizes the current knowledge of bat/mine habitat relationships, mine assessment and inventory techniques, and bat-compatible mine closure methods. Bats and Mines has been distributed to all major federal agencies responsible for bat conservation and mine reclamation, and is having a tremendous impact on resolving the bats and mines crisis (Vories and Throgmorton, 2000).

When the NABMP started, the emphasis was getting the word out that abandoned mines were important habitat for bats. Since that time several interactive forums have been devoted to the topic. The most recent, a bat gate design technical interactive forum, was held in Austin, Texas on March 4-6, 2002. Topics ranged from overviews of past closure efforts to determining what gates are best in different situations to associated policy and management strategies. The resultant proceedings should serve as a comprehensive manual on bat gate design.

Objective 2: Conservation Action

___ In order to protect important mine-roosting bat populations, BCI provides technical and financial assistance when contacted by agencies, organizations, and individuals across North America. BCI has already provided assistance to dozens of natural resource managers nationwide, protecting more than a million bats at some of the largest and most important abandoned mine bat roosts in the states of Arizona, California, Colorado, Idaho, Illinois, Michigan, Minnesota, New Jersey, New York, Oregon, Pennsylvania, and Wisconsin. Abandoned mines that provide shelter for even small numbers of bats are deemed significant and are protected as well. When surveying abandoned mines, it is always best assumed that absence of evidence does not mean evidence of absence. Because bats may only use a mine at one particular time of year, protecting sites that have suitable conditions for bats is also a criteria included under conservation actions.

Conservation actions are often facilitated by BCI being able to provide funding for

conservation-based research projects. For example, a graduate student from the University of Wisconsin in Madison, is developing improved methods for censusing large numbers of mine-roosting bats while also studying the effects of airflow on migratory patterns. Research of this type aids in our understanding of the ecological interactions between bats and mines.

Conservation action also presents a valuable opportunity to work with community groups and volunteers. Assistance from local grottos and grassroots organizations increase the likelihood of a successful project. In 1996 during the Blackball Mine project in Illinois, it took 420 man hours to complete the project. Without tremendous cooperation among partners and volunteers, the project would not have been quite so successful. Not only can volunteers help build bat gates, but they are useful in continuing long-term monitoring of sites, especially those sites with high potential for vandalism.

Objective 3: Interagency Coordination and Legislation

BCI fosters cooperation and communication between government and state agencies, private organizations, and industry to ensure that wildlife and mine-land managers have the best and most current information on mine assessment and closure techniques for bats, thereby increasing the efficiency of bat conservation efforts. The aforementioned bat gate design technical forum could not have happened without the help of a myriad of groups and agencies. BCI continues to initiate cooperative agreements with federal, state, and private agencies and industries that promote cooperation and partnership. Already cooperative agreements have been developed with the BLM, Forest Service, Natural Resources Conservation Service, National Park Service, and Fish and Wildlife Service.

Mine closure programs and policies, regulated by both federal and state law, can have profound effects on bat conservation. An on-going status review of all existing and proposed state and federal abandoned mine reclamation legislation has begun to determine the extent to which bat conservation needs are addressed. When necessary and appropriate, BCI will develop and propose suitable bat conservation language for incorporation in local, state, and federal mine reclamation legislation.

Objective 4: Research and Monitoring

___BCI supports and conduct research and monitoring with direct implications for improving bat conservation and abandoned mine-land management. Research in bat conservation is essential for providing natural resource managers the most current information available upon which to base critical management decisions. Pre- and post-monitoring efforts of gated mines will increase the effectiveness of future bat conservation measures.

In February of 2002, BCI completed an evaluation of abandoned underground mine distribution relative to mine-roosting bat species ranges. A Geographical Information System (USGS Mineral Databases, 2000) was used to produce a model wherein the number of mine-dwelling bat species and the density of inactive underground mines and prospects were individually ranked by ecosystem. These maps are available to public and private mine-land and wildlife management agencies and organizations. They can be essential planning tools to assist managers with prioritizing regional abandoned mine inventories and bat habitat protection and restoration efforts.

Additional monitoring efforts will be focused on recording effectiveness and species-specific acceptance rates of bat-compatible gates. Data on specific habitat characteristics selected by bats at mine-roosting sites (such as temperature, humidity, and air flow) is also needed. This information will not only aid in current bat conservation efforts but will also be important in future artificial bat roost construction projects.

Conclusion:

___Over the years attitudes toward abandoned mine closures and bat conservation have changed from only gating mines that showed use by an endangered species to gating mines with any bat sign. Individual states also continue to contribute significantly to bat conservation by incorporating bats into their AML programs and by promoting research before and after gating projects. The need to protect the public from abandoned mine hazards and the need to protect bats no longer conflict. Placing bat-compatible gates over mine openings that keep people safe

while allowing bats free passage are cost effective alternatives to permanently sealing mines.

Mining industry partnerships with BCI and state wildlife agencies provide an excellent opportunity to demonstrate the benefits of mining, not only to the economy, but to the environment as well. In the future, BCI hopes to have bat conservation measures incorporated into standard reclamation practices. By sharing responsibilities for conservation actions, by cooperating and partnering, and by being proactive, solutions will be reached that allow bats to thrive and mining companies to garner positive benefits.

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