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Wisconsin Gains Key Bat Sanctuary
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Tuttle, Merlin

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By Merlin Tuttle

Although my history with the bats of Neda Mine goes back 20 years, the whole story actually begins 82 years ago, when this lucrative iron mine was abandoned after many years of excavation. Since closing in 1914, the mine's four miles of underground tunnels had gradually become both a critical sanctuary for homeless bats and a potential human deathtrap. As the timbers slowly rotted and ceilings began to collapse, the mine became extremely hazardous.

In 1976, the 44 acres of mine property were acquired by the University of Wisconsin in Milwaukee (UWM) for field studies. That spring, a group of local cavers reported to me that they had discovered a large number of hibernating bats in the mine. Although they warned me of the mine's many dangers, none of us could resist exploring. We planned a date to do a preliminary bat survey, unaware that the mine's future was at that very time a point of controversy.

I'll never forget that first visit. Naively, we went during the spring thaw, an especially dangerous time to be inside an unstable mine. We entered through a portal half filled with ice and crumbling rock that appeared ready to collapse at any second. The next hundred yards or so had already caved in to the point that we could barely move without causing further collapse. Then, just as we were beginning to move comfortably in a maze of more stable tunnels, documenting the large numbers of bats we were discovering, we heard the unmistakable rumble of a major cave-in somewhere toward the entrance. We froze--crouched and barely breathing--and listened to the echoes of water dripping all around us, hoping that nothing more would fall and there would still be a way out. My associates recommended a hasty departure, and luckily, we managed to pass back through the entrance unscathed.

Despite the danger, it was fortunate we didn't know better than to make that first trip when we did--for as soon as I returned to my office, I inadvertently learned that the fate of the mine was a point of debate between biologists and administrators at UWM. The administrators were concerned--justifiably so--about the liability risk of allowing mine entrances to remain open. Fortunately, the UWM Field Station Manager, Dr. Paul Matthiae, who was responsible for managing the newly acquired mine, was one of the rare people in those days who understood the value of bats.

With urgent appeals, we convinced the university to keep the mine open. We then verified that it sheltered at least 75,000 bats of four species, a population ranking it among the top dozen hibernation sites known to remain in North America. Most of the bats were little brown bats *(Myotis* lucifugus), though they shared the mine with several thousand northern long-eared bats *(Myotis septentrionalis*), eastern pipistrelles (*Pipistrellus subflavus*), and big brown bats *(Eptesicus fuscus*).

Prior to disturbance by modern humans, individual American caves sheltered from hundreds of thousands to millions of hibernating bats each winter, in at least one case more than 10 million. However, as early as the mid-1800's, some of America's largest bat populations were already in alarming decline, victims of growing human disturbance that forced them to arouse from hibernation and waste critical fat reserves before spring. To survive severe Wisconsin winters, some bats must rely on stored fat for seven months or longer.

As mines like Neda were abandoned and became too dangerous for people to enter, they simultaneously became refuges of last resort for bats. The threat of a structurally unstable environment is minor to a bat, compared to the danger of being awakened or even killed outright by humans. Today, these mines are lifeboats for America's remaining bats.

Through the North American Bats and Mines Project, a joint effort of
BCI and the USDI Bureau of Land Management, enormous progress is now being made in protecting mine-dwelling bats, though many continue to be buried. The story of Neda Mine illustrates how easily we can still lose some of America's largest bat roosts without even being aware of our loss.

Although UWM administrators did cooperate with our 1976 request to save the bats, new administrators 18 years later were again primarily concerned about the liability of leaving the mine open, and once more Neda's bats faced an uncertain future. Fortunately, BCI trustee Verne Read lived nearby in Milwaukee and was able to help.

As a major sponsor of the North American Bats and Mines Project, Read was especially concerned. He arranged meetings with the university administrators, the Wisconsin Department of Natural Resources, and local community leaders, and then organized a group known as The Friends of Neda Mine. The group, in turn, worked with BCI's North American Bats and Mines Director, Dan Taylor, and the new UWM Field Station Manager, Dr. Jim Reinartz, to organize the two-year effort required to make the mine safe for both bats and humans.

The first task was to census the bats, which had not been studied by a biologist since my last visit in 1979. Were the bats still using the mine? If so, how many were there? To everyone's surprise, when Dan Taylor, bat biologist Dr. Scott Altenbach, and Dr. Reinartz recensused the mine in the winter of 1994-1995, they found that the population had grown from 75,000 in the 1970s to between 300,000 and 500,000. Further, they suspected that even more bats might have been in areas now unreachable by humans. These bats likely migrate to the Neda Mine each fall from an area covering four states and many thousands of square miles.

We may never know where all the new bats came from, but it is clear that continuing cave disturbance, combined with closure of other old mines, has left bats with fewer and fewer options. Over the past 20 years in Wisconsin and Michigan, several mines known to shelter large numbers of bats have been closed, and there is a high probability that literally millions of bats have been buried or left homeless. Neda Mine may have become a last refuge.

Illustrative of the validity of university concerns about safety, the entrance I had considered safest in 1979 had entirely collapsed prior to the beginning of censusing in 1994. However, despite the instability of several sections (especially near entrances), the mine does contain several miles of tunnels that will remain intact long into the future. The real challenge at this point was how to stabilize and protect entrances required for bat entry and exit, as well as for the airflow necessary to maintain the stable, low temperatures required by hibernating bats.

The UWM field station conducted a careful survey of airflow patterns to decide which entrances were most important to keep open. Since cold air was entering through the lowest entrances and relatively warmer air was exiting through the highest, we carefully preserved the chimney-type air movement by keeping several of the highest and lowest entrances open on opposite sides of the mine. A total of 18 entrances had to be made safe. Thirteen were closed with large rocks that excluded people but permitted as much continued airflow as possible; the remaining five were stabilized and gated with bat-friendly structures.

We also built a large, eight-foot-square steel cage over the highest vertical shaft, ensuring continued airflow and enabling bats to enter with minimal risk of capture by predators. Raccoons, weasels, owls, and feral cats are all known to hunt bats as they slow down to enter gates; fewer entrances at the mine meant that bats were more vulnerable at the entrances that remained. Careful entrance monitoring will be necessary next spring and fall to determine whether we need additional measures to prevent excessive bat mortality. The UWM field station will also monitor roost area temperature and airflow with remote sensing devices.

To reopen and stabilize the lowest main entrance required blasting through 30 feet of surface rock prior to digging a 35-foot-deep by 90-foot-long trench. A five-foot-diameter steel culvert was laid into the trench, then we back-filled with earth over the culvert and added a bat-friendly gate at the outer end. This new culvert will prevent potential collapse caused by the freeze-thaw effects of frigid winter air. It will also reduce the risk of predators by ensuring a larger flyway than was previously available at that location.

The Neda Mine Bat Sanctuary now protects one of the three largest hibernating bat populations known to remain in North America. The second largest population, at the abandoned Millie Hill Mine in nearby Michigan, was also recently protected through the North American Bats and Mines Project [*BATS*, Winter 1994].

In spite of such progress, however, conservation assistance to bats in mines has never been more urgently needed. Dozens of mines in Wisconsin and nearby Michigan remain unsurveyed. Each is capable of sheltering many thousands of bats, and most are at risk of immediate closure. One was closed last winter with the bats inside, but we convinced the owner to reopen it and allow us to gate the site in time to save thousands of bats. The smaller the number of remaining mines, the greater the odds of burying a large aggregation of bats, a fact which illustrates the hurdles we face every day with the North American Bats and Mines Project.

The success at Neda Mine required extraordinary commitment, and we are deeply appreciative to Verne Read and the many partners whom he, Dan Taylor, and BCI members Joan and Mike Spector organized to make that success possible. A large proportion of the $120,000 required to complete the project came from the Wisconsin Department of Natural Resources, the University of Wisconsin-Milwaukee, and the U.S. Fish and Wildlife Service. The remaining funds were contributed or raised by Verne and Marion Read, the Spectors, and Gilbert Boese, President of the Zoological Society of Milwaukee. Jim Reinartz headed the project on-site, greatly assisted by Paul Matthiae, now Chief of the Information Synthesis/Adaptive Strategies Section for the Bureau of Integrated Science Services, and Gerald Dorscheid, a recently retired engineer for the Wisconsin Department of Natural Resources.

We also especially thank the following members of the University of Wisconsin-Milwaukee administration for their excellent cooperation: Assistant Chancellor Don Melkus, Dean Marshall Goodman, and Assistant Dean James Sullivan.

Merlin Tuttle is Founder and Executive Director of BCI.

Clusters of little brown bats spend seven months in hibernation each winter. The Neda Mine shelters one of the two largest populations of this species known to remain and is a key resource over a multi-state area.

Merlin Tuttle surveys bats in Neda Mine in 1977. Upon returning to this same room several months later, he discovered tons of rock had fallen from the ceiling.

Bat biologist Dr. Scott Altenbach led BCI's 1995 census of Neda Mine. Altenbach is an expert on abandoned mine exploration.

Thanks to Bob Eder of Levitation Drill and Blast, the renovation of Neda's main passageway was a great success. Rather than trying to restabilize the old passage, Eder created a new one, removing 75 feet of earth then installing a 90-foot culvert and backfilling over it.

The eastern pipistrelle, one of the species now protected at Neda Mine, often returns to the same hibernation site within a cave or mine over consecutive winters.

Verne Read examines one of the newly gated entrances to Neda Mine. For six weeks, field station volunteers monitored all the mine openings using night-vision scopes and red lights to count the exiting bats. Out of dozens of entrances, this was one of four deemed to be the most important.

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