

Indiana
Department of Natural Resources
Division of Reclamation
Abandoned Mine Land Program

Submits

AML Site 17
Turkey Run State Park
Bat Gating Project

for the

2001 Abandoned Mine Land
Reclamation Award

INDIANA AML SITE 17 TURKEY RUN STATE PARK

NARRATIVE

INTRODUCTION

This project is not the typical large, comprehensive project that is usually submitted for OSM's Abandoned Mine Land Reclamation Award. It consists simply of the closure of one mine entrance, was completed in two days, and cost less than \$2000.00. There were no newspaper reporters or ribbon cutting ceremonies when the project was completed. However, there are several very unique aspects of this project that make it worthy of consideration for such an award.

This site is located within the boundaries of Turkey Run State Park which encompasses some of the most scenic areas of the state. Deep canyons nestled in the shadows of sandstone cliffs and peaceful hemlock groves harbor a rich variety of ruggedly beautiful scenic views. From the tiny mosses and ferns to the majestic old-growth walnuts and sycamores, lush plant communities thrive there, supporting an abundance of wildlife. This rugged beauty was realized early on, as Turkey Run became Indiana's second State Park in 1916.

Much of the park property was originally owned by the Lusk family. Salmon Lusk fought in the War of 1812 and served under General William Henry Harrison in the Battle of Tippecanoe. In 1826, he completed the construction of a grist and saw mill on the north banks of Sugar Creek. This mill was built with a hand-cut stone foundation and a dam that diverted water through a race to turn a horizontal waterwheel situated under the mill floor. In 1841, Salmon built a brick home also on Sugar Creek where he and his wife raised eight children. The Lusk Home still stands today and is one of the highlights of the Park's historical resources. To heat this home, Salmon and later, son John, operated a small coal mine located at an outcrop at one of the bluffs of Sugar Creek, not far from the house. In the *23rd Annual Report of the Indiana Department of Natural Resources and Geology*, published in 1898, the State Geologist, W.S. Blatchley states "4 ft. of coal is reported on John Lusk's place, north side of Sugar Creek". It is at this old drift mine, that has been open for well over 100 years, that this project takes place.

PROJECT DEVELOPMENT

Turkey Run State Park soon became, and still is, one of Indiana's most popular State Parks, hosting over 750,000 visitors a year. Today, a hike on Trail 4 will take you directly to the Lusk Coal Mine (*See Attachment A*). For decades, thousands of Park visitors have passed by the coal mine, many of them stopping and peering into its dark depths. For obvious safety reasons, the park made several attempts at installing fences across the mine entrance with the desire to keep people from actually entering the still open mine (*See Photo # 1*). These attempts were never completely successful, as each fence would ultimately be breached. Park visitors, including children, would then take their chances crawling around inside the mine where, three to four inch diameter logs used as roof supports, are still present. The public was not adequately protected.

As many know, these old abandoned mines often mimic natural cave environments very well and many animals, such as bats, inhabit them as if they were natural caves. In fact, abandoned mines have become critical habitat for many bat species, including the federally endangered Indiana Bat. In an ironic and unfortunate twist, these fences, which were never successful at keeping people out of the mine, were very successful at keeping the bats out. Although this mine may have provided suitable habitat, the bats were unable to negotiate the chain link fences, and therefore unable to utilize this potential habitat. When this project was undertaken, there were no bats utilizing this mine. The habitat was also not adequately protected.

These two problems, extreme public safety hazard and lack of habitat protection, needed to be addressed. When it was brought to the attention of the Division of Reclamation (DoR), we immediately put the site on our high priority list. Our main concern was the public safety hazard of an open mine, especially one in a heavily visited state park that had a hiking trail leading directly to it. We also felt that even though no bats were currently utilizing the mine, the potential was there for bat habitation, and therefore this issue was worthy of consideration. Throw into the mix the realization that it would be nearly impossible, because of the terrain, to get heavy equipment or machinery down to the mine without considerable and unacceptable damage to the park environment. Therefore, it soon became obvious that a typical shaft sealing operation was not the best alternative. It was realized that the installation of a bat gate would be able to solve all of the problems above, and therefore was the chosen method of closure.

A bat gate is a permanent, heavy, welded angle iron structure installed at the entrance of a cave or mine. They are designed to disallow human ingress, but allow bats to safely fly in and out of the opening. A properly designed and installed gate is nearly impossible to breach, and is accepted very well by most bat species. However, locating a contractor willing to build such a gate had proven to be somewhat difficult.

It was obvious that one of our typical contractors that was accustomed to pushing huge amounts of dirt and rock with large bulldozers, backhoes and scrapers was probably not the best choice to build a bat gate within the boundaries of one of Indiana's most visited and scenic State Parks. Also, the State Park did not want any disturbance to the delicate nature of the surrounding environment or the native flora and fauna. Therefore, all materials, equipment, tools and supplies would have to be carried in by hand down the hiking trail which included a narrow, winding path on a very steep slope. Many large earth moving contractors are unwilling to take on such small, labor intensive projects. All of the bat gates in Indiana have been built under similar conditions; manual labor, no heavy equipment, little to no impact to the surrounding environment.

A call to the Indiana Division of Fish and Wildlife's Non-game Biologist regarding this issue had put us in contact with the Indiana Karst Conservancy (IKC). The IKC is a non-profit organization, consisting entirely of volunteers, that is dedicated to the preservation and conservation of Indiana's unique karst features for their inherent geological, biological and archaeological importance. One of the IKC's main purposes is to protect Indiana's natural cave environments, which often suffer from vandalism and littering from thoughtless visitors, by the installation of bat gates. The IKC realized that installing bat gates for the Indiana Division of Reclamation would be of mutual benefit. Abandoned coal mines, although not natural, offered

additional bat habitat when many natural caves were being developed, polluted, or completely destroyed. The public safety hazard would be eliminated, but the bat habitat would be protected. By working with the IKC, the DoR would get a contractor with bat gate building experience and, being a non-profit organization, would get the lowest possible bid. In turn, the IKC could use all of the funds they earn for their own karst conservation practices. The proverbial win-win situation.

As previously mentioned, the IKC members are all volunteers, which means that they all have normal day jobs. This simple fact dictates that all work has to be accomplished only on weekends. While building this gate and others for the DoR, it is common for these volunteers to put in a 14 to 16 hour day on Saturday and feel like their getting off early with a 10 or 12 hour day on Sunday. These members come from all four corners of the state, and even from Illinois and Kentucky, so there is often a two or three hour drive home.

The next problem that had to be addressed was the issue of a State agency paying a non-profit organization for services rendered. This too was no easy task. Traditionally, when a reclamation project is proposed for funding, it must first go through a competitive bid and contract award process which takes a minimum of five months to complete. Although this site did not qualify as an emergency project, the urgency to get it completed prior to the upcoming tourist season, made this time delay unacceptable. We had to find another way to compensate the IKC.

In 1999, the Division of Reclamation in conjunction with area Resource Conservation and Development District (RC&D) Councils implemented the *Partners in Reclamation Program* which offers local landowners the opportunity to restore certain lands that have been adversely affected by past coal mining operations (*See Attachment B*). This unique program has been very successful by getting the landowner directly involved in the reclamation process. The RC&D funds these projects through grants obtained from the Division of Reclamation. With the cooperation of the local council, the Sycamore Trails RC&D, the DoR was able to fund this project in an expedient and efficient manner that we were not able to accomplish alone. Finally, we were ready to build a bat gate.

PROJECT CONSTRUCTION

The date that had been scheduled to build the gate was the last weekend of April, 2000. The weather was perfect, clear, sunny and crisp. Plenty of volunteers showed up that day. The first order of business was to get all the materials, supplies and tools down to the mine entrance. This task alone proved to be very difficult. The coal mine was more than a half mile from the nearest road, but fortunately, there was a trail that could be driven to within 100 yards of the mine entrance. However, this was a hiking trail, it was not necessarily designed for vehicular use, especially a large truck and trailer carrying 20 foot lengths of angle iron. And because there was absolutely no room to turn the truck and trailer around at the end of the trail, the driver not only had to negotiate his way in and around rocks, trees and terrain, but he had to do it all in reverse. A round of applause met him as he finally reached the end of the trail.

From that point, we still had another 100 yards to go, and that was down a rough, crooked set of steps cut into the side of a very steep slope. Teams of volunteers carried tools, portable welders,

cutting torches, tanks, and 20 foot lengths of angle iron to the mine entrance (*See Photo # 2*). The 4' X 4" angle iron cross members weighed in at roughly 200 pounds while the 6" X 6" angle iron sill plate weighed 300 pounds. Nearly a ton of tools and materials were carried down by hand. Finally, all materials were at the mine entrance and construction could begin.

A gate consists of three main components. A 6" X 6" inch piece of angle iron is used as the sill plate and acts as the foundation for the gate. At least two 4" X 4" angle irons are used as upright, vertical support columns. Additional 4" X 4" angle irons are evenly spaced as horizontal cross members. The first order of business was to prepare the floor of the entrance to accept the sill plate. This was accomplished the old fashioned way with picks and shovels. Several inches to a foot or more of dirt and loose rock had to be removed before hitting solid rock. Because it is imperative that the sill plate is properly set and leveled, several areas of rock had to be painstakingly chipped away in order to produce a flat and level foundation. As the workers labored at moving rock and dirt, they speculated that this must be very similar to the work that was accomplished 100 or more years ago as the Lusk family mined coal at this very site. Eventually, a flat, level surface was produced, and the 300 pound sill plate was heaved into position, leveled, and set in place (*See Photo # 3*). The most difficult and critical aspect of building a bat gate had been accomplished.

Two 4" X 4" angle iron pieces were then cut to length for use as the upright support columns. After proper spacing, the bottom of these columns were welded to the back of the sill plate. At the top of each, a hole is drilled into the ceiling rock, and a twelve inch long, one inch diameter steel rod is driven into it with only an inch or two left sticking out. The top of the support column is then welded to that steel rod. In this manner, the support columns are permanently secured, both top and bottom, and are ready to accept the horizontal cross members.

The first 4' X 4" cross member is laid upon and welded directly to the sill plate (*See Photo # 4*). The positioning of this first cross member is not actually necessary, but it adds to the weight and overall structural integrity of the gate's foundation. Subsequent cross members are then simply cut to length, properly spaced and welded to the support columns. This part of the gate construction often goes rather quickly, at least relatively speaking. The 5 3/4" spacing between cross members is critical. It is large enough that bats will readily fly through it, but small enough to keep people out. The orientation of the cross members, open side down, is also critical. In this aerodynamic position, air can flow over the cross members much like it would over the wing of an airplane. In this position, the gates offer the least resistance as possible to air flow in and out of the mine which is a crucial factor to temperatures inside the mine. This is vitally important because proper mine temperatures are what create viable bat habitat. Many of the old bat gate designs caused undo air flow restrictions to the point that bats could no longer use the very caves or mines that the installers were trying to protect.

After the last cross member is finally welded into place (*See Photo # 5*), the painting crew then cleans the entire gate and coats it with a rust-inhibiting primer. While this is taking place, the rest of the crew is hauling all the tools and equipment back up the hill to the truck and a long day is nearing its end. In an effort to save organizational funds, the group spent the night camping at the campground in the State Park. Early the next morning, the painting crew returned to put a final coat of paint on the gate while the construction crew headed to another nearby AML site to

begin construction of yet another gate.

The final task is to install an informational sign on the gate (*See Attachment C*). This sign, based on one developed by Bat Conservation International, explains the dangers of underground coal mines and the vital roles that bats play in our ecosystems. We now install this sign at all of our gate installations. It does a great job at explaining to someone who has just stumbled upon this somewhat odd looking structure in the middle of the woods, what is this and why is it here? With some hesitation, we can state that to date, we have had no vandalism at any of our gates, and we contribute that, at least partly due to this well worded sign. With the addition of this sign, the gate is completely finished (*See Photo # 6*).

CONCLUSIONS

Installing bat gates at abandoned coal mines is nothing new. Hundreds of them have been installed out West. However, here in the Midwest, it is still somewhat of a new approach but is becoming much more common. The reason for this is the realization that bat gates can accomplish two tasks very well; the protection of the public from the extreme hazards of open mines *and* the protection of bat habitat. We no longer have to choose one over the other.

Indiana has chosen a very unique course of action by utilizing non-profit organizations to build this gate (Indiana Karst Conservancy) and to fund this project (Sycamore Trails RC&D). These non-profits are unique in this industry because they are motivated by conscience and not by profit. They are also a joy to work with because of this reason and because they truly believe in what they do and why they do it. This is a lesson that many of us can take to work everyday.

As previously mentioned, at the time of the gate installation there were no bats utilizing this mine entrance due to the chain-link fences that had been installed. As we had never actually entered the mine itself due to the inherent dangers, we were not entirely sure that suitable bat habitat was present, although we certainly speculated that it was. Although it had only been six months, in the fall of 2000 a bat survey was conducted in order to determine if in fact bats had discovered the newly gated mine and had begun to inhabit it. The results of this survey (*See Attachment D*) were conclusive, bats were indeed utilizing the newly gated mine. This upcoming fall, we will continue this research by trapping the mine entrance to determine species and numbers of bats utilizing this mine.

As a follow-up to this gating project, Turkey Run State Park with cooperation from the Division of Reclamation, Indiana Geological Survey and the Office of Surface Mining, is in the initial stages of developing a large educational sign to be placed near the Lusk Mine Gate. This three panel interpretive sign will depict the development of coal in Indiana, historical coal mining during the period of the Lusk Mine, and the hazards associated with and bat usage of open mines today. The bat gate and this sign will help educate thousands each year as they hike the beautiful hills and hollows of Turkey Run State Park.