Whispering Ranch Mine - Bat Gating Project
Located on BLM land outside of Wickenburg, Arizona.

Mining in this area began its boom days back in 1863 when Henry Wickenburg discovered his famous Vulture Gold Mine. The Vulture produced well over 200 million dollars until it was closed during World War II in 1942. Sometime during this active mining period the Whispering Ranch Shaft was driven deep into the ground. Since official records are lost or forgotten, we really don't even know the original name of the shaft or when it was dug. Clues to the date are evident in a large Trash Dump near the shaft. Expert Mine Historian Allan Hall has dated the cans pictured below to a range of 1887 to 1904. These cans are called "Solder Top Cans with a Norton Side Seam." The rectangular meat can has a more precise date range of 1900-1904. Other artifacts on the site have been dated to the early 1920's, so what we can say is that the site was actively mined during the early 1900's.

Trash Dump at Mine Site

When we first visited the site in the fall of 2009 we noted that there were limited existing remnants of this significant mine site. Nothing is left of the headframe, processing structures, or living facilities of the past workers. All that is left is the large dump rock piles, a few concrete hoist bases, and a deep clear shaft encircled with a simple steel fence. As is the case with many old mines, when work is ceased at a specific site, the wood, tools and machinery are packed up and reused at the next promising location.

Original Fenced Vertical Shaft

The shaft itself is a straight vertical drop of at least 180 feet down to some complex wooden cribbing. Near the bottom is a horizontal drift that was dug following the ore body. The complex cribbing at the bottom of the shaft may be the remnants of a trap door system that enabled the miners to dig and work much deeper, while protecting them from falling debris. Even a small rock falling 180 feet straight down a shaft can kill a miner. Timber cribbing was also installed in shafts when the miners would encounter soft rock in the walls. As you can see in the photo below, the upper rock is fairly strong and has seemed to stay solid for the last 100 years. This does not mean that this mine

will stay open indefinitely, as mines such as this one may only stay open scores to hundreds of years.

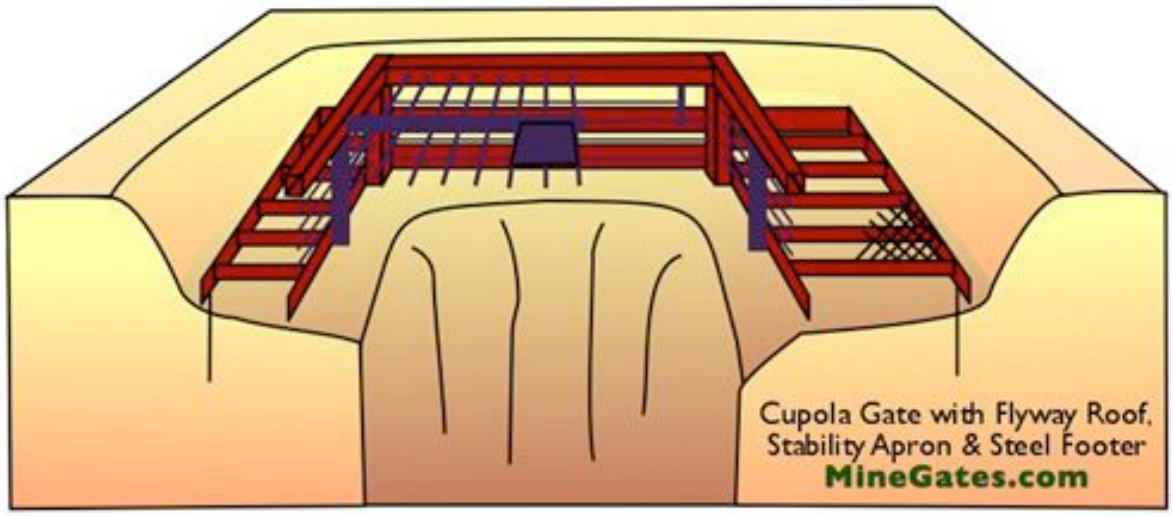
View Down the Vertical Mine Shaft

Before doing any work at a mine site, the Bureau of Land Managemant (BLM) first goes through a series of processes to decide what is the most appropriate plan to manage that site. During this process Jason Corbett of Bat Conservation International (BCI) and Bill Burger of the Arizona Game and Fish Department (AZGFD) were brought in to do an underground inventory of this abandoned mine. During the underground inventory it was discovered that the mine was a warm season roost for a colony of California Leaf Nosed bats (Macrotus californicus). Subsequent surveys by the AZGFD revealed that the shaft was also being used during the winter making the site even more worthy of protection. This bat plays a really important role in reducing insect populations in the area and throughout the southwestern US. Additionally, during the mine inventory Jason and Bill discovered

that Barn Owls were not only roosting in the mine but also nesting. The owls are advantageous to the local area because they reduce rodent populations. It is probable that the bats and owls are roosting at different times of the year, but they both play an important role in controlling pests in the neighborhood. The fact that these two species use the mine as habitat strongly supported the gating and protection of this unique site.

Closeup of the California Leaf Nosed Bat (Macrotus californicus)

After taking measurements at the mine site, and discussing various gating options, we began our design of the gate. The primary goals of human safety and wildlife access were the central focus, but a variety of other criteria also drive the gate design. Since the California Leaf Nosed bat is a very agile flyer and the fact that they are flying straight up a deep vertical shaft, we decided to implement a Flyway Roof where the bat can fly directly vertical out of the gate. This design helps the bats avoid predation at the gate since they don't have to slow down while passing the bars. Another design feature that we added to this gate is the Stability Apron. Sections of the collar of this mine consisted of loose rock that might collapse in the future. To avoid potential holes around the bottom of the gate we extended a wide steel Stability Apron at least 3 feet around the entire base of the gate. This apron also acts as a steel footer discouraging vandals from digging under the gate, and avoids the time-consuming onsite construction of a more traditional concrete footer. In order to provide bat researchers with access to the roost, we included an entryway door in the center of the top of the gate. At this location a rope rigged to the gate will freely drop down the center of the shaft without touching walls, thus avoiding potential rockfall while descending the pit. As shown in the following drawing, the gate is recessed below the immediate ground surface. This was done for two primary reasons. First, the surface fill consisted of waste rock from the mine which was somewhat loosely compacted. By digging down to original underlying rock, we had a better foundation to pin the gate to the ground. The second reason is to hide the gate from easy view from casual onlookers driving along adjacent roads.



Cupola Gate Cutaway View

Once our gate design was complete we began construction of the gate at our shop in Tucson, Arizona. When possible we prefer to build our gates in a workshop instead of on-site construction. We've found that we can build gates quicker and with higher quality in a shop. Due to the size of this gate we decided to build the gate in three sections. This also made the gate small enough for trailer transport to the mine site. Weighing in at around 5,000 pounds we used our shop's chain hoists to move the gate around during construction. Since this gate site was in an area that could be prone to vandalism and attacks we built the gate with heavy materials and two types of steel. The frame structure was built of heavy ¼ inch mild steel. The bars, and bar mounts were built of work hardening Manganal Steel. The result was an extra strong gate that would be very difficult to vandalize.

Gate Loaded on Trailer at the Shop

Work began at the site with the clearing of the waste rock around the collar of the shaft. This work was carefully done by our skilled backhoe operator Bruce Lynn, as we had to move the waste rock and dirt away from the mine shaft without dumping any into the hole. While we were digging we found pieces of green ore in the rock dump around shaft entrance. The miners were probably mining copper at this site.

Careful Backhoe Clearing of Waste Rock Around Mine Shaft Collar

Clearing of the waste rock around the collar continued all the way around the shaft. To avoid adjacent vegetation and the historic concrete winch foundations, our backhoe could only operate from limited positions around the pit. In these sections we dug out much of the waste rock with hand shovels. Notice that the workers who are near the open shaft are roped in with climbing harnesses and wear rock climbing helmets. Since natural rigging points were scarce at this site, we rigged our ropes directly to one of our

work trucks. If one the workers accidentally fell into the shaft they would be quickly stopped by the rope and would be able to easily ascend out of the pit. Also note the high visibility yellow safety vests. These bright colors make it easy for the backhoe operator to see the workers. Safety is extremely important on our projects. We try our best to be thoughtful about every action, and take our time doing our work so that it is done correctly, and in a safe manner.

Backhoe and Hand Clearing of Waste Rock Around Mine Shaft Collar

Once the collar of the mine had been cleared we assembled the three sections of the gate by welding the two Stability Aprons to the main Cupola gate. With the main section of the Cupola gate sitting on the trailer, we used the backhoe to lift the two heavy Stability Aprons into place for welding.

Welding Stability Apron to Main Cuploa Bat Gate

Once the three sections of the Cupula Gate were welded together we used the trailer to move the assembled gate next to the mine shaft. By using a combination of two chains, a 3-ton floor jack, wooden pallets, two trucks, and the trailer, we were able to place the finished gate onto skid boards directly adjacent to the mine shaft. We then slid the gate into the final position with chains attached to the work truck and the backhoe.

Placing Cupola Gate over the Mine Shaft

With the Bat Gate in place we next drilled one-inch diameter holes around the perimeter of the gate apron. These holes were drilled about one foot deep into solid rock. Next we drove steel mounting pins into the rock to ensure that the gate could not be easily moved. For added stability the pins were then welded to the edge of the gate apron.

Final Cupola Bat Gate Welding

Once the final welding and positioning was complete, we backfilled the edge of the gate apron so that the surface would be flush with the base of the gate. This further helped stabilize the gate and controls water runoff from undermining the structure. Our final work included building a dirt/rock berm around the gate area so that the entire structure was mostly hidden from view. From the nearby roadway, the site looks the same as it did before we installed the gate.

Installed Cupola Bat Gate

Funding for this project was generously donated by the mining company Freeport McMoRan, the largest copper mining company in the world. Further support was offered by bat specialist Jason Corbett of Bat Conservation International. Historical consultation and other support was offered by Allan Hall. Construction and Fabrication work was done by Bruce Lynn, Tom Gilleland, Bob Draves, Robert Dietz, and Diane Serpa. And thank you to the folks at the Bureau of Land Management (BLM) for completing the environmental compliance, and supporting the protection of this unique site. The project was completed by MineGates, Inc. (www.minegates.com)