CONSOL, UDOGM & OSM Monitor Burrowing Owl Nests

Monitoring Nest Activities

The Emery Mine in south-central Utah has planned to conduct underground coal mining activities in an area where the surface supports a white-tailed prairie-dog (*Cynomys leucurus*) colony (Figure 1). Burrowing owls (*Athene cunicularia*), a sensitive species in Utah, often use abandoned prairie-dog holes for nesting. A burrowing owl (Figure 2) was observed in the area during one of the field surveys funded by Consol Energy. Consequently, representatives from Consol and Mt. Nebo Scientific, Inc. have developed a Burrowing Owl Protection and Enhancement Plan for adjacent areas of the mine site. Part of the plan entailed creating artificial burrows and nests for the owls as well as monitoring them for occupancy along with the impacts that subsidence may have on both natural and artificial burrows.

Figure 1: Prairie-dog burrows

Biologists and engineers from the Emery Mine, the State of Utah, Division of Oil, Gas & Mining (UDOGM), and the Department of Interior, Office of Surface Mining (OSM) have employed OSM's GeoVISION borehole camera, a camera used more for water and oil wells, to record underground activities in all artificial burrows as well as a representative number of natural burrows in the study area (Figure 3).

Figure 2: Burrowing Owl
Image courtesy of www.naturespicsonline.com

Figure 3: Henry Austin (OSM) prepares the equipment to photograph inside a natural burrow while Joe Helfrich and Ingrid Campbell (UDOGM biologists) stand by.

Artificial Burrows

Field surveys have been planned by Consol to continue monitoring the sensitive wildlife species in the area, with current emphasis on the burrowing owls. Additionally, plans and designs were made to create *artificial burrows and nests* for this species.

Seven artificial burrows and nests were constructed within the Emery Mine permit area in April 2010. Five of the burrows were constructed within a future subsidence zone, whereas two were placed just outside of it.

Figure 4: Joe Helfrich (UDOGM) measures depth for new nest.

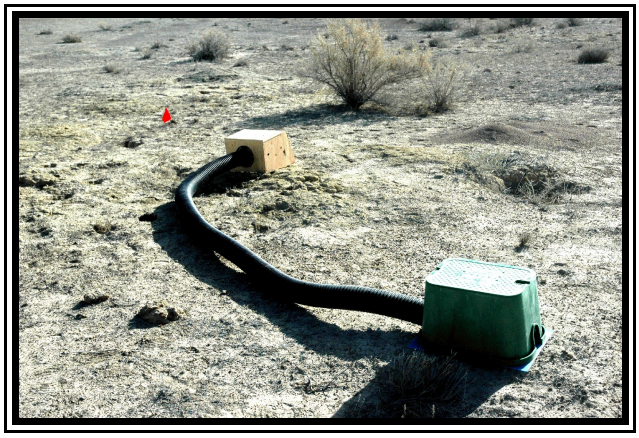

Figure 5: Corrugated pipe for tunnel separates nest and entrance.

Abandoned prairie-dog mounds were utilized for some of the artificial burrow construction sites. In areas where they were not present, similar mounds were created that simulated natural conditions.

Nests and burrows were excavated using a small track-hoe. Once excavated, nesting boxes were placed at a depth of 4 feet below the ground surface (Figure 4). The nests were made from 21"(L) x 16"(W) x 17"(H) irrigation valve boxes (Figure 5). A perforated plexiglass floor (perforated for drainage) was attached to the bottom of the nests to increase structural integrity during the subsidence period. A 4-inch hole was cut in the side of each nesting box to accommodate the tunnel attachment. Resident soil material was then placed on the nest floors. The tunnel to the nest was created using 10 ft long sections of corrugated and perforated 4-inch ADS pipe (Figure 5).

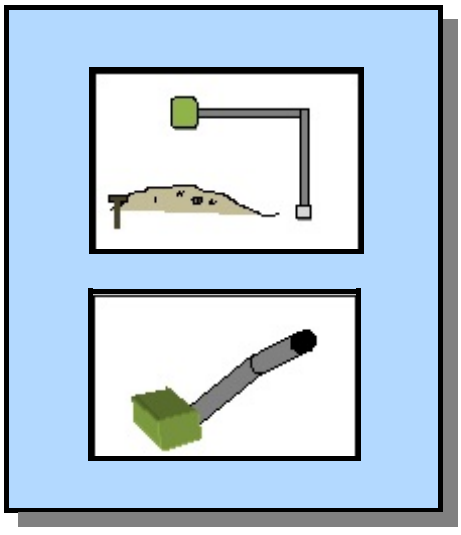

Figure 6: Artificial nest and burrow design.

The tunnel pipe was placed underground with a 90° angle

(horizontal) bend in the center to decrease daylight to the nest. The pipe was also placed approximately 45° (vertical) from the nest to the surface opening creating a gentle angle for the owls to enter and exit the nest through the tunnel (Figure 6).

Figure 7: Nests, tunnels and entrances placed below the ground surface.

Entrances to the burrows were made at ground surface by attaching the corrugated pipe to a wooden box that was constructed of treated plywood (Figure 7). The size of the each entrance box was 20"(W) x 12"(D) x 11"(H). This design was used following a visit to Antelope Island State Park in northern Utah, where a biologist there, Jolene Hatch, used this same design and has successfully encouraged owls to nest in the park – even with bison roaming on and around their artificial burrows.


Figure 8: John Gefferth (Consol) rakes the resident soil that covers the artificial burrows.

The nests, tunnels and entrances were placed underground (Figure 7) and covered with resident soil to create a mound that simulated natural conditions (Figure 8).

Perching posts for the owls were then placed near some of the artificial burrow entrances (Figure 9).

Due to an unusually high snow year, and because the snow remained on the ground surface in the valley well into the spring, the site conditions delayed construction of the artificial burrows from late-February or early-March (when the owls begin returning from their winter migration to select their nests), to mid-April 2010. Consequently, because this may have impacted the returning owls in selecting our artificial burrows for nesting, the site will also be

Figure 9: Artificial burrow at the Emery Mine site (the 4th East Portal is shown in the background).

monitored in the subsequent year(s) beginning in spring 2011. Furthermore, as a means to deter the use of the artificial burrows by prairie-dogs during the winter months, thus possibly discouraging owl use the following spring, the entrances were sealed October 5, 2010 for the winter months (Figure 10). They were re-opened February 23, 2011 in time for the return of the burrowing owls for the spring mating season.

Underground Burrow & Nest Photography

Figure 10: Patrick Collins, a biologist from Mt. Nebo Scientific, shown at Artificial Burrow No.7 when the entrance was sealed for the winter.

Joe Helfrich, a UDOGM biologist, designed a study plan to monitor the structural integrity as well as the underground activities of owls and prairie-dogs (or any other animals) in the artificial and natural burrows within the study area. The UDOGM study has employed a GeoVISION borehole camera that was borrowed from OSM. Moreover, the camera will be used to monitor the impacts that mining-related subsidence may have on both the natural and artificial burrows. Helping UDOGM with the project were representatives from OSM, Consol Energy and Mt. Nebo Scientific, Inc. (see Figures 11 - 14). Data and images from this onsite camera work are kept at the UDOGM offices in Salt Lake City, Utah pending a final report on the findings.

Conclusions

Biological field studies will continue at the Emery Mine site. We are anxiously awaiting the arrival of the burrowing owls from their winter migration journey. We do not know if an owl pair will choose one of our artificial burrows, a natural burrow, or for that matter, any of the burrows near the Emery Mine site. In the mean time, however, we will continue to survey the owls and photograph the artificial and natural burrows in the study area.

Figure 11: The camera crew including representatives from UDOGM, OSM, Consol & Mt. Nebo Scientific, Inc.

The continued field studies have been designed to: (1) monitor the impacts of subsidence caused by mining on the artificial burrows, (2) monitor the impacts of subsidence on the natural burrows, (3) monitor the use of burrowing owls and prairie-dogs in all burrows (both artificial and natural), and (4) provide important data about impacts to these species and their habitats from subsidence because future coal mining may eventually expand into similar habitats within the Emery Mine permit area.

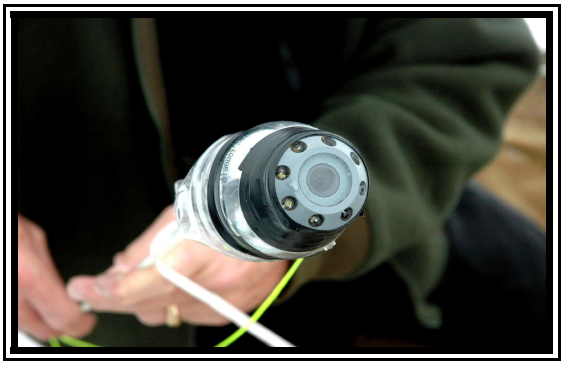

Figure 12: The GeoVISION borehole camera that is placed through burrows and underground tunnels.

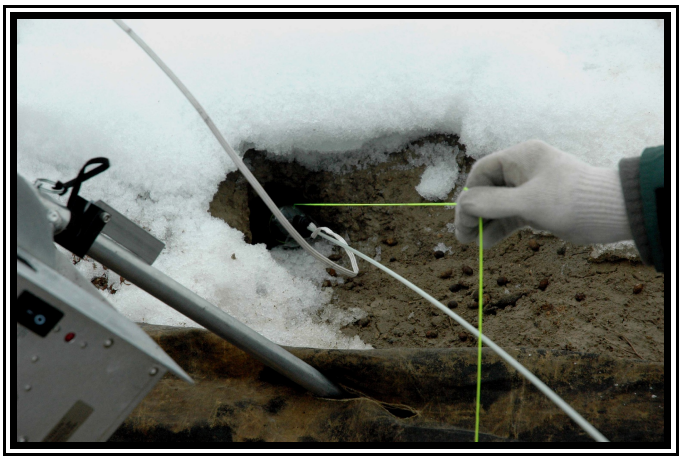

Figure 13: The camera is inserted down the holes and "fished" around the curves of the tunnel.

Figure 14: Camera monitor shows evidence of prairie-dog use in Artificial Burrow No. 1

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