

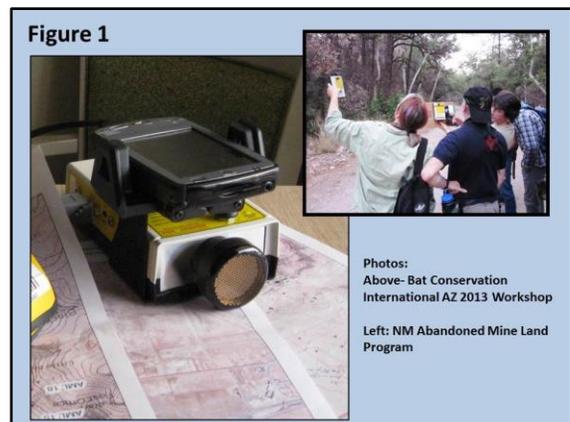
Monitoring and External Bat Surveys at New Mexico Abandoned Mines – First Season Use of Equipment Supplied by OSMRE / TIPS.

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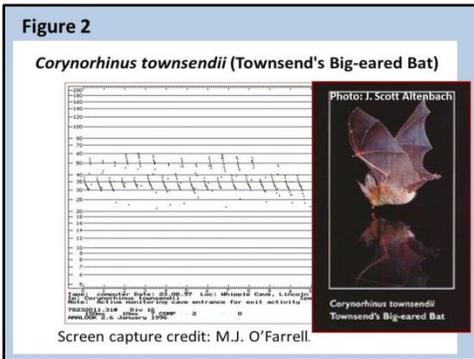
Abandoned mines pose safety threats to people but also provide important habitat for wildlife, bats in particular and especially the guild of species that are dependent on subterranean habitat. Though abandoned mines may not provide the stability that caves do, they provide valuable habitat for bat species that use the underground environment of mines as roosts (maternity, hibernation, bachelor, rest /migration). Bats also use abandoned mines as food/water sites and swarming sites (meet and mate). Townsend's Big-eared Bat (*Corynorhinus townsendii*) is a species of concern throughout the U.S. and frequently occupies abandoned mines (Harvey et al. 2011). The NM Abandoned Mine Land Program (NMAMLP) constructs bat-compatible closures on mine features that show evidence of bat use based on internal surveys. These structures keep people out but allow bats and other wildlife continued access. Monitoring bat numbers over time at abandoned mine sites will add to our knowledge of population trends valuable to bat conservation. Observations will give us some evidence of how bats are responding to bat-closures and may help us improve future designs. Regarding the fungal infection that is associated with White-nose Syndrome, causing devastating bat mortality in the Eastern U.S., monitoring data would be a valuable contribution to the watch for the possible spread to Western regions.

NMAMLP began its first season of effort, May through September 2013, to establish a bat roost monitoring project that tracks changes in numbers and species composition of bats that we know are using or have used abandoned mines. Site selection was based on significant bat use of abandoned mines (J. Scott Altenbach, pers. comm. 2013; NMAMLP bat geodatabase query, 2013) where internal bat surveys had taken place. Subsequent years of monitoring will place added emphasis on maternity colonies at a time before pups are born (generally late May-June) when colony size is most stable (Sherwin, et al. 2009). NMAMLP sites that have been safeguarded with bat-compatible structures or have planned construction in the future are the focus of these external bat surveys that involve bat counts, behavioral observations, and bat acoustic recordings. It is an opportunity to supplement the internal evaluations of bat use of abandoned mines typically performed by the AML Environmental Coordinators and consultants before bat-compatible structures are constructed.

The DOI Office of Surface Mining Reclamation and Enforcement (OSMRE) and Technical Innovation and Professional Services (TIPS) responded to our request for equipment so that we could begin our pilot project this season. TIPS provided an Anabat SD2 CF Bat Acoustic Detector (Figure 1). Bats use calls to locate prey and other objects (echolocation) at frequencies often above what we can



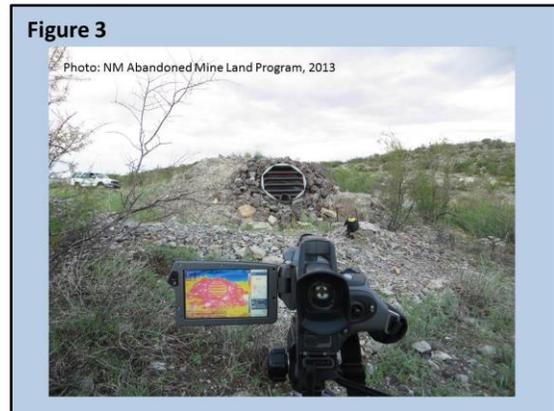
hear (ultrasonic). The bat-detector translates these calls to frequencies that we can hear. The recordings were used to compare sonograms (graphs of the calls) of bat echolocation and



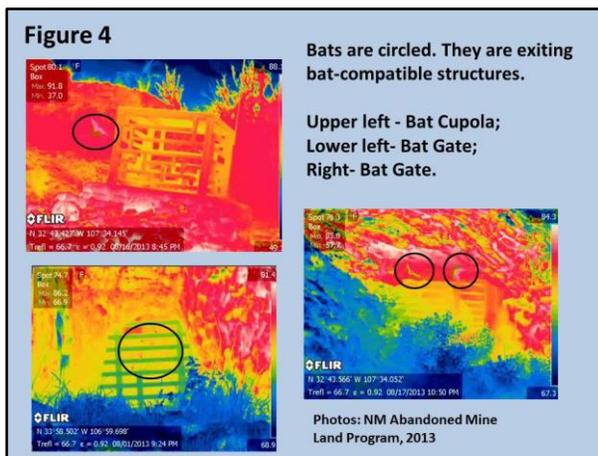
allowed us to list probable bat guilds and species that may have been using the habitat or emerging from mine openings during the surveys. Figure 2 is an example of a sonogram of a Townsend's Big-eared bat.

We needed to use a video camera capable

of recording bat emergence and behaviors at the mine sites at dusk and into the night for our surveys. TIPS checked out a FLIR 600 video camera for our use during the months of bat activity (May-October 2013). This video is capable of using the far infrared wavelengths to detect thermal radiation emitted from



objects allowing us to see in the dark. Figure 3 illustrates a recording session at a culvert-bat gate closure picturing both the FLIR Camera and Anabat Detector. Figure 4 presents snapshots of video taken by the FLIR camera



showing bats exiting three bat-compatible closures.

Our next goal involves implementing a geodatabase design to organize monitoring data and links to associated video and sonogram files. Videos are an effective means to analyze and document behavior. They are also a wonderful way of sharing information with others. TIPS have also given our program access to Camtasia Studio 8 screen recording and video editing

software. Our goal is to compose and produce videos to better summarize and present our findings. NMAMLP plans to enthusiastically continue monitoring efforts during subsequent years.

Citations:

- Harvey, M. J., J. S. Altenbach and T.L. Best. 2011. Bats of the United States and Canada. The John Hopkins University Press. 202 pp.
 Sherwin, R.E., J.S. Altenbach and D.L. Waldien. 2009. Managing Abandoned Mines for Bats. Bat Conservation International. 103 pp.