

Bat Species Richness and Abundance at Chiricahua National Monument and Fort Bowie National Historic Site

Final Report for the 2007 Fieldwork

Source: K. Krebs. Center for Sonoran Desert Studies, Arizona-Sonora Desert Museum.

PROJECT SUMMARY



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Western red bat (*Lasiurus blossevillei*)

Introduction

In 2007, the Arizona-Sonora Desert Museum completed the 8th and 7th year of a 10-year inventory and monitoring bat program initiated in 2000 at Chiricahua National Monument (NM) and in 2001 at Fort Bowie National Historic Site (NHS). Both sites lie in southeastern Arizona in the Chiricahua Mountains, where four ecosystems converge: the Sierra Madre mountain range, the hot and dry Sonoran Desert, the milder Chihuahuan Desert, and the Rocky Mountains. The purpose of this study is to determine which bat species are present in the parks, inform park managers, identify trends, and indicate how bats respond to weather extremes like drought or wet periods in similar mountain regions.

Methods

Researchers conducted 11 evenings netting at five different water sources in the parks during May, June, and August 2007 (before and after or during the summer monsoon rains). Researchers, with one to three trained assistants, inventoried each water source site for one night in May or June, then repeated the inventory at each site in August. Water sources were chosen as the study sites because bats normally use streams and washes as travel corridors, for drinking, and to catch insects. To capture bats, up to three separate 2.6 m or 6 m standard mist nets were hung over the water at each site and monitored from dusk until midnight. The researchers collected data for each captured bat, including weight, species, sex, reproductive condition, external parasites, and other physical traits. Bats were released at the capture site after the data was collected. The researchers also continued recording bat vocalizations at the study sites, which was started in 2006.

Chiricahua National Monument

Researchers monitored bats the same four sites that were monitored in 2000–06 during the same months. Each site contained water in 2007 when they were sampled, though this is variable between years. One site was netted per evening. The nets were opened as early as 7 p.m. and closed at late as 12:35 a.m. At least two people processed the bats captured and count. The researchers also recorded bat vocalizations for many of the bat species.

Fort Bowie National Historic Site

Bats were monitored at one site, Apache Springs, which has been monitored since 2001 and is a reliable water source. One to three nets were set up at the site for one evening in June and August. The nets were opened as early as 6:30 p.m. and closed by 12:20 a.m. Two people processed the bats. From 2001 to 2003, bats were inventoried in June. In 2004, the researchers began inventorying bats in June and August for consistency with the Chiricahua NM data.

Results

Chiricahua National Monument

A total of 161 bats of 14 species were captured at Chiricahua NM. During the previous eight years of monitoring, the researchers captured a total of 17 species. A new species, the occult little brown bat (*Myotis lucifugus occultus*), for 2006 at Chiricahua NM, was captured again in 2007.

Fort Bowie National Historic Site

Researchers captured a total of 43 bats of five species at in 2007, the highest number of individual bats captured since the study began. Over the previous seven years of monitoring, the researchers captured nine species at the site. Of the two new species recorded in 2005, only one was captured again in 2007.

Discussion

In the 2007 field season, researchers captured the fourth highest number of bats for the study. Water levels at the monitoring sites had an adequate amount of water following a normal monsoon season in 2006. Bats have been more difficult to capture when more water is available throughout the duration of this study than they are in periods of drought and water is scarce.

Changes in rainfall in the Chiricahua Mountains over the past few years have probably affected the number of bats captured. As the amount of rainfall decreases, the number of bats captured in mist nets increases. In 2007, both parks had standing water at all of the netting locations during the summer. In 2007, all of the water sources at Chiricahua NM appeared to have sufficient water levels during the drier months compared to previous study years.

Chiricahua National Monument

Bats were more difficult to capture during the netting attempts in August at Chiricahua NM throughout the study when water was more available because of rain, weather extremes, and the summer monsoon. However, the number of species captured in the park in 2007 (14) was the second highest for the study. Three previously captured species were not recorded in 2007: the federally listed endangered lesser long-nosed bat (*Leptonycteris curasoae*), Mexican long-tongued bat (*Choeronycteris mexicana*), and Allen's big-eared or lappet-browed bat (*Idionycteris phyllotis*), though the occult little brown bat was captured for the second year. The western red bat (*Lasiurus blossevillei*), previously only captured in 2003, was captured again in 2007. The female western red bat was pregnant and captured at the same site where three other bats of the same species were captured in 2003.

Captures of the silver-haired bat (*Lasionycteris noctivagans*), a tree bat, dropped from a high of 46 captured bats in 2003 to 6 in 2007. Hoary bats (*Lasiurus cinereus*) were documented each year of the study, including 2007, with the exceptions of 2002 and 2006. It is unknown whether the captured females are residents or migrating through the area. In 2007, researchers captured eight Townsend's big-eared bat (*Corynorhinus townsendii*). Based on previous year's data, a maternity colony of these bats may exist in the mountain range. Previous studies



Antje Adams processes a bat in the field.

or mine checks in the area documented clusters of pregnant Townsend's big-eared bats.

The researchers did not capture any whiskered screech-owls (*Otus trichopsis*) as they had in past years, they observed two fledglings sitting on the ground during one of the netting sessions. No spotted owls (*Strix occidentalis*) were observed as they had been in 2005 and 2006, or any black bears (*Ursus americanus*), which were also observed in previous field seasons.

Fort Bowie National Historic Site

Apache Springs at the Fort Bowie NHS is a reliable, year-round spring. In 2007, more bats were captured at this site during the June netting than the previous five years of monitoring. Flooding in 2006 and recent clearing of vegetation may have opened the area and altered the stream flow. These changes allow larger species to use the drainage now, which may explain why larger species (the endangered Lesser long-nosed bat, Townsend's big-eared bat) were not captured at the site before 2005. In June 2007, researchers captured 33 female cave myotis (*Myotis velifer*), most of which were lactating, probably indicates that there is a maternity colony in the area. Bats may roost in a gated mine at the park.

The lesser long-nosed bat was also captured in Fort Bowie NHS for the first time since it was first recorded in 2005. The captured bat was a post-lactating female and researchers heard others flying in the area. The female that was captured was caught in the top shelf of the net, probably indicating that this bat was flying through the area as the majority of the bats caught are trapped in the lower shelves of the net and near the water.

Literature Cited

Krebbs, K. 2007. Bat species richness and abundance at the Chiricahua National Monument and Fort Bowie National Historic Site (8th year for the 10-year project): Final report for the 2007 fieldwork. Tucson, AZ: Center for Sonoran Desert Studies, Arizona-Sonora Desert Museum.