



Bat Blitz Brief for Great Basin National Park



Scientists set up a mist net to capture bats as they fly over this pond.

Bats in Great Basin National Park

Great Basin National Park (GRBA) is known for dark skies, bristlecone pines, Lehman caves, and Wheeler Peak. The park and surrounding valleys offer an elevational gradient of bat habitat from 5,000 to 13,000 feet.

Bats provide society with a range of important ecosystem services, such as billions of dollars in pest control each year. Unfortunately, bats face numerous threats in the U.S., including habitat loss and disease. Regular monitoring of bat populations is increasingly important with the rise of White-Nose Syndrome (WNS), a fungal disease that affects hibernating bat populations. WNS can result in the death of many bats in a colony and has killed over 8 million bats since its discovery. Thus, collection of baseline data about bat populations before the arrival of WNS is critical to ensuring the health of these important creatures.

Nine species are regularly documented in GRBA. Three additional species (western red, spotted, and canyon bats) may occur or have been documented nearby.

Two bat projects are ongoing at GRBA in addition to collecting baseline data and documenting the spread of WNS. The goal of the first project is to better understand long-term demographics and movements of western big-eared bats by inserting small marker tags into individual bats. These tags allow individuals to be identified with hand-held readers when recaptured, or automatically scanned by tag arrays when they enter or exit core roosts. The second project is focused on determining seasonal and annual variation in sex, age, and reproductive condition of Mexican free-tailed bats at a roost near the park.

To gather these data, the Mojave Network Bat Blitz took place August 26-29, 2019 in the park and surrounding valleys. Table 1 lists the bat species detected and whether they were recorded during acoustic sampling (to detect and record bat echolocation calls), captured with mist nets (deployed to capture bats flying across open areas or pools of water), or both. This Bat Blitz provided an opportunity for National Park Service staff to develop skills in bat survey techniques.

Table 1. Species detected and the number of sites that each species was detected via acoustic and capture methods. Ten bat species were detected during the Bat Blitz through acoustic sampling and capture surveys. Whenever possible, we paired a mist net survey with a bat detector.

| Common Name | Scientific Name | Acoustic (# sites) | Capture (# sites) |
|-----------------------------|----------------------------------|--------------------|-------------------|
| Pallid bat | <i>Antrozous pallidus</i> | 2 | 2 |
| Western big-eared bat | <i>Corynorhinus townsendii</i> | 4 | 5 |
| Big brown bat | <i>Eptesicus fuscus</i> | 6 | 1 |
| Silver-haired bat | <i>Lasionycteris noctivagans</i> | 9 | 4 |
| Hoary bat | <i>Lasiurus cinereus</i> | 6 | 4 |
| Western small-footed myotis | <i>Myotis ciliolabrum</i> | 8 | 7 |
| Long-eared myotis | <i>Myotis evotis</i> | 7 | 4 |
| Long-legged myotis | <i>Myotis volans</i> | 8 | 8 |
| Canyon bat | <i>Parastrellus hesperus</i> | 1 | 0 |
| Mexican free-tailed bat | <i>Tadarida brasiliensis</i> | 13 | 3 |

What is a Bat Blitz?

A Bat Blitz is a coordinated survey designed to sample the bat community within a specific area. A total of 39 participants from Great Basin National Park and an additional eight National Park Service units, the Mojave Desert Network, the Nevada Department of Wildlife, the U.S. Fish and Wildlife Service, Great Basin Institute, Christopher Newport University, Oregon State University, and volunteers.

Two Methods for Detecting Bats

Mist Net (Capture) Surveys

Mist net (capture) surveys are important because having bats in the hand is the only way to obtain certain kinds of information about them. We can tell the sex of the bat, measure it, weigh it, and determine its age. In-hand examination can also give insights into its reproductive state and overall health. There are also bat species which are easier to recognize in the hand than acoustically.

Acoustic Surveys

Acoustic surveys give us different kinds of information. Unlike humans, acoustic detectors do not get tired and can effortlessly run all night, for weeks if desired. They also allow us to sample a much wider range of places, because capture methods only work where bats are vulnerable to capture. Some species, such as the higher flying bats, are easy to detect acoustically and often difficult to capture.

Where and How We Sampled

Seventeen locations were sampled at water sources, foraging sites, and known roosts. Western big-eared bat and Mexican free-tailed bat roosts were sampled to assist ongoing bat studies at GRBA. Many of the sites sampled for the Bat Blitz were outside of park boundaries (Figure 1). One acoustic detector failed, and acoustic data were intentionally not collected from the Mexican free-tailed bat roost due to the extremely high volume of bat activity at the site.



The western big-eared bat was a target species for this bat blitz, and we were able to insert marker tags in 60 individuals throughout the week. These marked bats will help us understand roost fidelity of bats in this area.
Photo / Michael Vamstad



A biologist concentrates on removing a bat from a mist net while its would-be prey (a large moth) watches on.

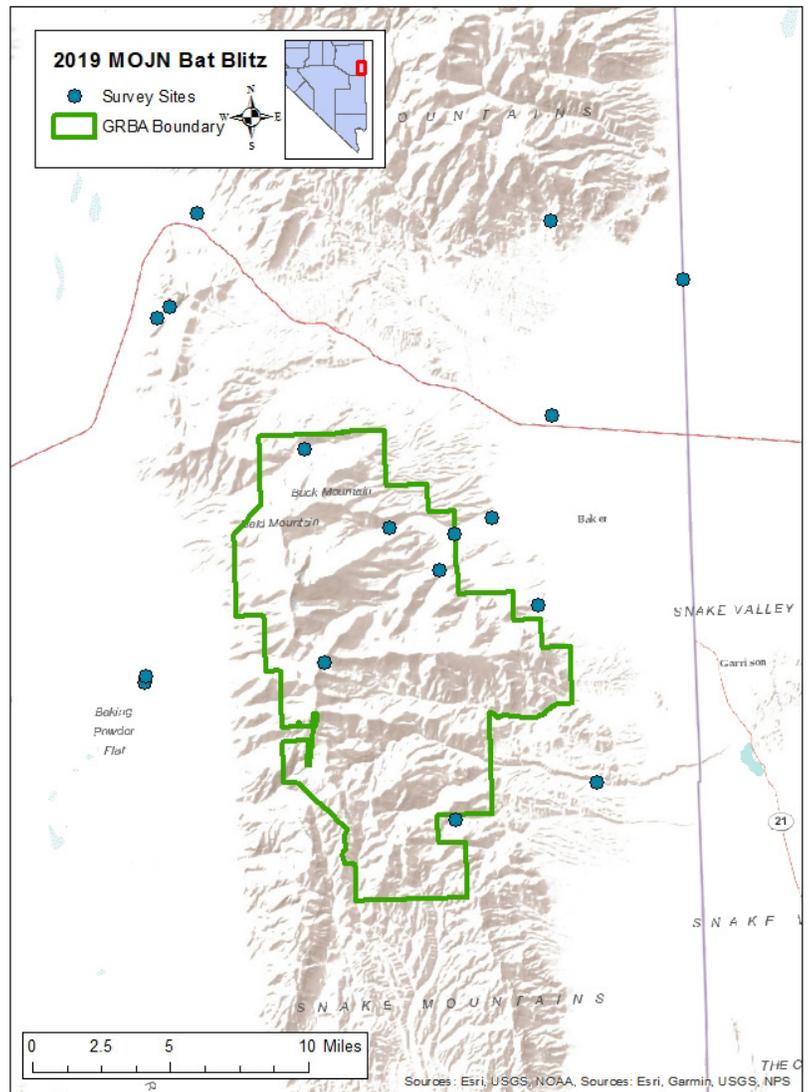


Figure 1. Blue dots indicate locations where acoustic and/or capture methods were employed to monitor bats.

Results

We surveyed 17 sites over four nights within the Snake Range (one site was surveyed twice for a total of 18 surveys) and captured 183 bats of nine species (pallid, western big-eared, big brown, silver-haired, hoary, western small-footed, long eared myotis, long-legged myotis, and Mexican free-tailed bat). Also, 521 Mexican free-tailed bats were captured at the Mexican free-tailed bat roost. In addition to the species captured, we recorded several canyon bat calls, one of few records of this species from this area.

Across sites, nine species were both captured and detected acoustically. One additional species was only detected acoustically (Table 1). Species detection patterns differed at the site level. Notably, most sites detected more bat species through recordings than captures. Aside from Lehman

Wetland, where the acoustic deployment failed, the only sites with more species captured than recorded acoustically were Grey Cliffs and Rock Spring.

Utilizing both capture and acoustic methods is important to maximize species diversity when surveying for bats (Figure 2). At three sites where no bats were captured, acoustic recorders still detected bats. There were several sites where some species were only recorded and at others only captured. The two surveys at North Fork Road Crossing show the effect that storms can have on bat activity; by returning to the same site on a clear night the crew was able to document four more species. This was also the only site where a western big-eared bat was captured away from a roost.

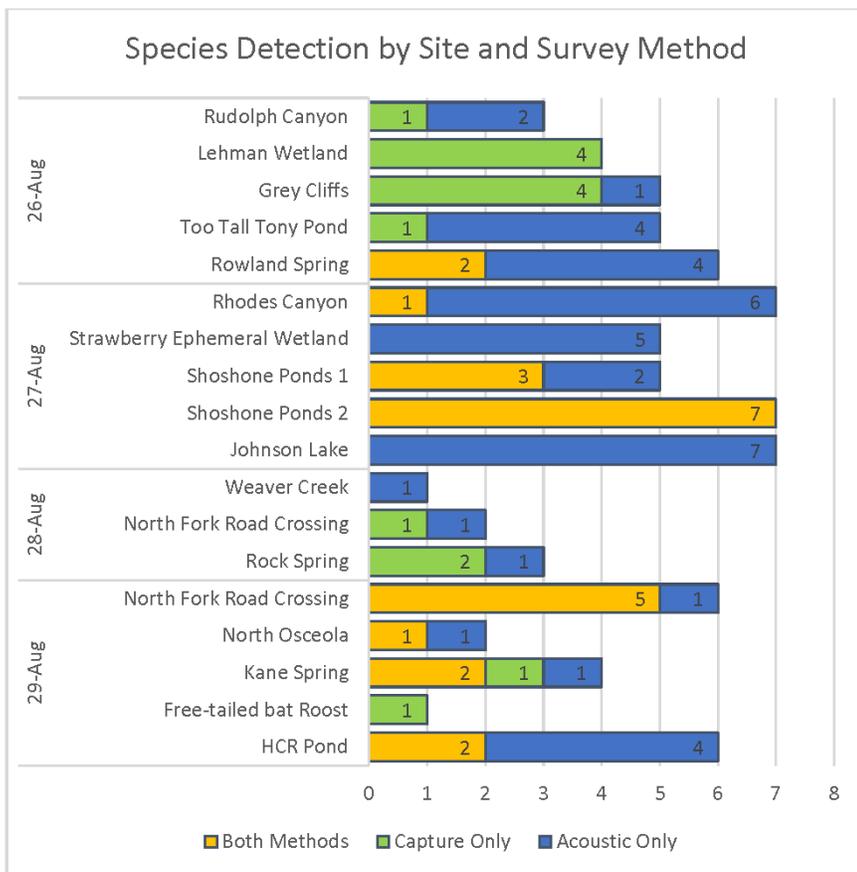
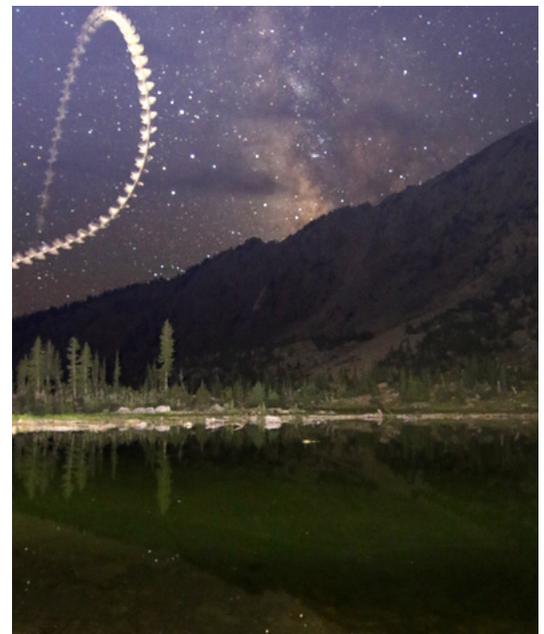


Figure 2. Bat species detection by site and survey method at the 2019 Mojave Desert Inventory and Monitoring Network Bat Blitz. No acoustic data were collected from Lehman Wetland or the Mexican free-tailed bat roost.



Conditions were not ideal for catching bats at Johnson Lake, but they could still be heard with bat detectors and seen flying over the alpine lake. NPS photo / Gretchen Baker

Acknowledgments

We thank park staff from the following NPS units – [Death Valley](#), [Great Basin](#), [Joshua Tree](#), [Lava Beds](#), [Lake Mead](#), [Mojave](#), [Pinnacles](#), [Timpanogos Cave](#), and [Zion](#) – for participating in this bat blitz.

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Cloudy sunset on Doso Doyabi Peak.