



Bat Blitz Brief for Joshua Tree National Park



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

Bats in Joshua Tree National Park

Joshua Tree National Park provides important habitat for bats, with its ponds and open areas where they forage, and granite rock formations and trees like palms where bats can roost. Many bat species are found in this park (a total of 12 were detected prior to this Bat Blitz).

Bats face numerous threats, including habitat loss and disease. Regular monitoring of bat populations is becoming increasingly important with the rise of White-Nose Syndrome (WNS), a fungal disease affecting hibernating bat populations. WNS often results in death of many bats in a colony.

WNS was first detected in New York state and over the past 14 years has spread across the east coast, Midwest

and now the Pacific Northwest. Park managers are concerned it will soon spread to other western populations. Thus, having baseline data about bat populations before the arrival of WNS is critical to ensuring the health of these important creatures.

To gather this baseline data, a Bat Blitz took place in May 2018, in the western and southern areas of the park. Table 1 lists the bat species detected and their method of detection: whether they were detected through acoustic sampling (using microphones that detect and record bat echolocation calls) or capture surveys (where mist nets are used to capture bats flying across open areas or pools of water), or both. Staff also used this Blitz as an opportunity to learn bat survey techniques.

Table 1. All species detected during the 2018 bat blitz and method of detection (acoustic and/or capture in mist net). The species listed below do not represent all of the species previously documented at the park (three additional species have been documented).

Common Name	Scientific Name	Acoustic	Capture
Mexican Free-tailed Bat	<i>Tadarida brasiliensis</i>	X	X
Pocketed Free-tailed Bat	<i>Nyctinomops femorosaccus</i>	X	X
Western Mastiff Bat	<i>Eumops perotis</i>	X	X
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	X	X
Pallid Bat	<i>Antrozous pallidus</i>	X	X
Hoary Bat	<i>Lasiurus cinereus</i>	X	–
Western Yellow Bat	<i>Lasiurus xanthinus</i>	X	X
Canyon Bat	<i>Parastrellus hesperus</i>	X	X
Big Brown Bat	<i>Eptesicus fuscus</i>	X	X
California Myotis	<i>Myotis californicus</i>	X	X
Yuma Myotis	<i>Myotis yumanensis</i>	–	X
Fringed Myotis	<i>Myotis thysanodes</i>	X	–
Long-legged Myotis	<i>Myotis volans</i>	X	X

What is a Bat Blitz?

A Bat Blitz is a coordinated survey designed to sample the bat community within a specific area. For this Blitz, staff from [Joshua Tree National Park](#) were joined by the [Mojave Desert Inventory & Monitoring Network](#), [Parashant National Monument](#), [Mojave National Preserve](#), [Death Valley National Park](#), [Grand Canyon National Park](#), [Great Basin National Park](#), [Lake Mead National Recreation Area](#), and [Pinnacles National Park](#) as well as staff from the [Calif. Dept. of Fish and Wildlife](#), and other bat experts.



Measuring a captured bat.



Setup of acoustic sampling microphone.

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.

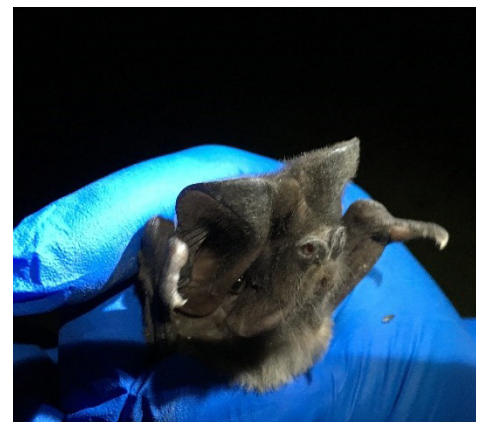
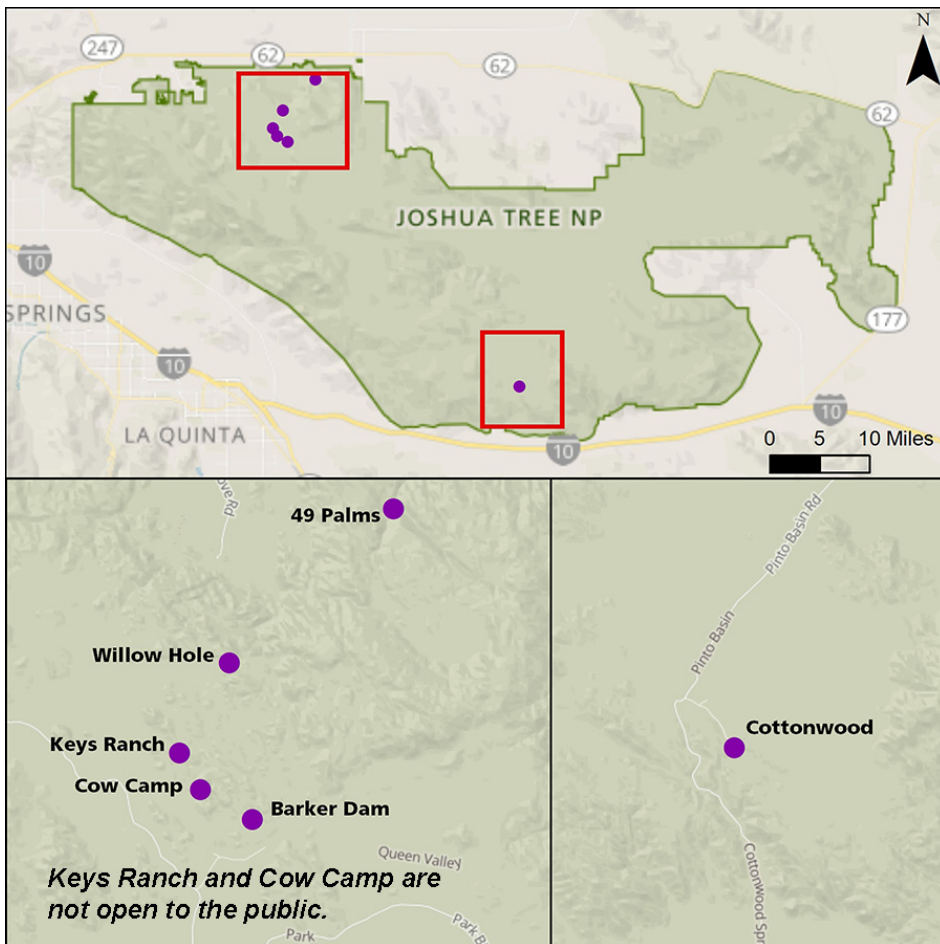
Acoustic Surveys

Acoustic surveys give us different kinds of information. Unlike humans, acoustic detectors do not get tired and 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.

The key point? Both are important! Using both methods allows us to gather robust data about bat populations within the park and get a more complete picture of the bat species using a particular area.

Where and How We Sampled

Six different locations were chosen for sampling either due to the presence of open water that bats are dependent on for drinking, or they provided fly ways or corridors that bats would forage along where nets could be set and bats may be funneled when corridors narrow (see Figure 1). Each site was visited twice (alternated surveys at 3 sites per night). Because bats are not all as easily detected using capture or acoustic methods, both were used simultaneously each night. This was especially important at sites that either had very little water or too much water which makes it hard to concentrate bats into areas that can be netted. For example, at Willow Hole where there was no open water, 5 species were captured using mist nets, but 9 total species were detected through both methods. Across all sites, two species were only detected acoustically and one species was only detected by capture (see Table 1). This validated our reasoning to use both methods.



Western Mastiff Bat



Pallid Bat and Western Yellow Bat

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

Total Bat Species Detected by Site

Barker Dam had the most individual captures, and tied with Keys Ranch for the most species captured (See Figure 2). The big brown bat (*Eptesicus fuscus*) was the most captured species and was captured at every site. The Yuma myotis (*Myotis yumanensis*) was only captured once (at Keys Ranch). Two highlights of the blitz were the capture of the largest bat in North American, the western mastiff bat (*Eumops perotis*) (Figure 2) and the western yellow bat (*Lasiurus xanthinus*) (see image at bottom of this page). The western yellow bat belongs to a genus of bats that primarily roost in trees and this species in particular almost exclusively roosts in palm trees (within the "skirt" of dead palm fronds that hang below the live fronds) which makes the palm oases in Joshua Tree that much more ecologically important. While Willow Hole had the fewest number of captures, it had the most captures of the Townsend's big-eared bat (*Corynorhinus townsendii*), a species of concern in California and other states.

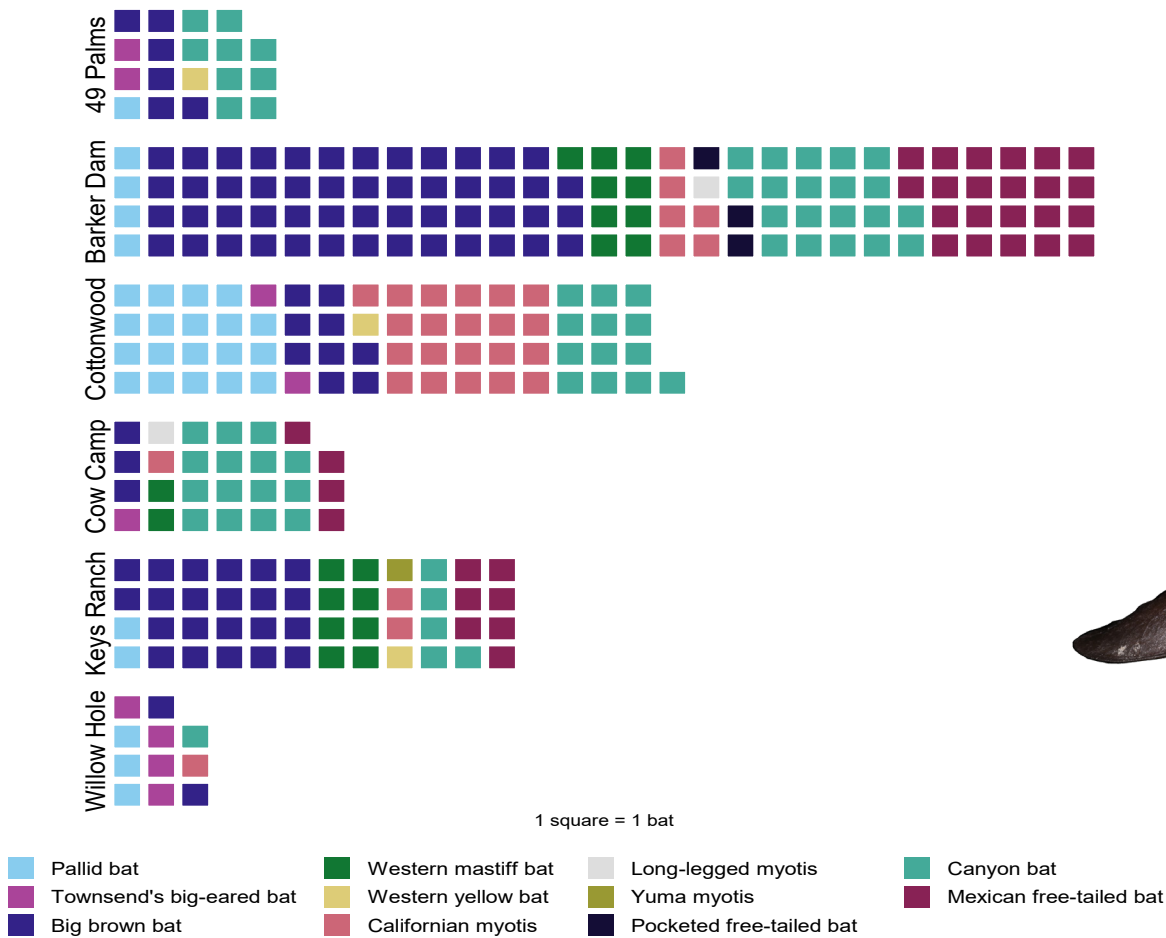
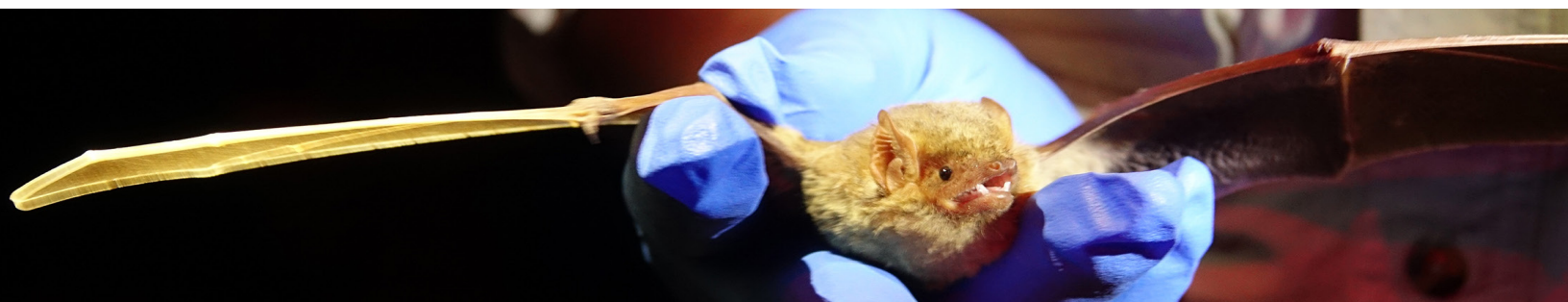


Figure 2. Number and type of bat species at each sample site. Each square represents an individual bat, and the colors represent different species.



Western Yellow Bat prior to being released after mist-net capture and measurements completed.