

THE MOJAVE DESERT INVENTORY AND MONITORING NETWORK

The National Park Service created the Inventory and Monitoring (I&M) Division 20 years ago to inventory natural resources and monitor some of those resources over time. There are 32 Inventory and Monitoring networks across the country, and each conducts "Vital Signs" monitoring by selecting species or ecosystems that are strong indicators of ecosystem health. The Mojave Desert Network (MOJN) is one of those 32 networks and includes nine different park units: Death Valley National Park, Mojave National Preserve, Castle Mountains National Monument, Joshua Tree National Park, Manzanar National Historic Site, Grand Canyon-Parashant National Monument, Tule Springs Fossil Beds National Monument, Lake Mead National Recreation Area, and Great Basin National Park.

When most people think about deserts, water is usually not the first thing that comes to mind. But for the ecosystems and wildlife within those ecosystems, water creates hotspots of diversity. You may be surprised to hear that there are thousands of desert springs across the Mojave and Great Basin deserts. Most of these springs are ephemeral meaning temporary. They may only have surface water after heavy rains when the groundwater is re-charged. Less common but more ecologically important across the landscape are "perennial" springs which usually have surface water year-round. These springs are literal oases in the desert and support abundant vegetation and wildlife.

Crews from MOJN visit desert springs in six National Park units where we measure the quantity and quality of the water, survey vegetation, and document signs of use by wildlife. These data are shared with park staff and are used to manage these sites for species that depend on springs. Reliant species include nocturnal wildlife such as mountain lions and some bats.

Due to isolation between springs, some species of invertebrates like springsnails and nocturnal amphibians are unique to a very small area, sometimes just a single spring. The relict leopard frog is only found in a handful of springs within or adjacent to Lake Mead National Recreation Area and had been thought to be extinct until the 1990's. Researchers have been augmenting the population by translocating frogs to additional springs in order to provide additional insurance against extinction.

Another group of nocturnal animals that depend on water in the desert are bats. There are possibly up to 20 different species of bats that occur within the Mojave and Great Basin deserts. Bats also face some large-scale threats across North America. A fungus that causes the disease White Nose Syndrome (WNS) in bat populations was originally found in New York State in 2006.



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A Mexican free-tailed bat in flight. Photo by Bryan Hamilton.

This disease has now spread across much of the U.S. though does not appear to be in our area yet. This fungus grows on some bat species while they hibernate and causes them to frequently wake up during hibernation depleting their fat reserves, and many bats die before spring arrives. Large-scale wind energy developments impact a different group of bats, many of which migrate long distances rather than hibernate. Due to these and other threats like light pollution, MOJN began a pilot monitoring project within our network of parks in 2018.

Bats can be difficult to monitor because they are nocturnal and usually can't be heard due to their use of echolocation that allows them to orient themselves in the nighttime environment. Lucky for us, we can conduct acoustic surveys using "bat detectors" which allow us to record and then identify the high frequency echolocation calls of bat species within our network. While there is some overlap, many of these calls can be attributed to specific species using special software that analyzes call sonograms.

We utilize the North American Bat Monitoring Program (NABat), a continental scale project to monitor bats at MOJN. To implement NABat we conduct acoustic surveys by deploying bat detectors across the landscape and look for possible changes



Crew monitoring a desert spring.

in bat species presence over time. Because most bats require water to drink, we have been able to use our data on desert springs to select locations to monitor bats. Preliminary data seems to suggest that areas with more diverse vegetation (like desert springs) tend to attract more bat species. Long term monitoring of habitat within the I&M networks provides crucial information about the wildlife living in the Mojave Network parks. Healthy springs, vegetation and nocturnal habitats are all interconnected pieces that support the wildlife here.



A bat detector deployment at Saratoga Spring in Death Valley National Park.

LEARN MORE

- MOJN Website: nps.gov/im/mojn/index.htm
- Video about our desert spring monitoring: youtu.be/BnhLUA0Sxoo
- NPR Interview about monitoring desert springs: knpr.org/knpr/2017-12/lake-mead-based-scientists-track-mojave-deserts-vital-signs
- Relict leopard frog article: unlv.edu/news/article/its-easier-being-green
- NABat: nabatmonitoring.org
- MOJN Facebook Page: facebook.com/npsmojn
- MOJN Instagram: instagram.com/mojnnp



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