



Desert Springs Monitoring Brief for Joshua Tree National Park



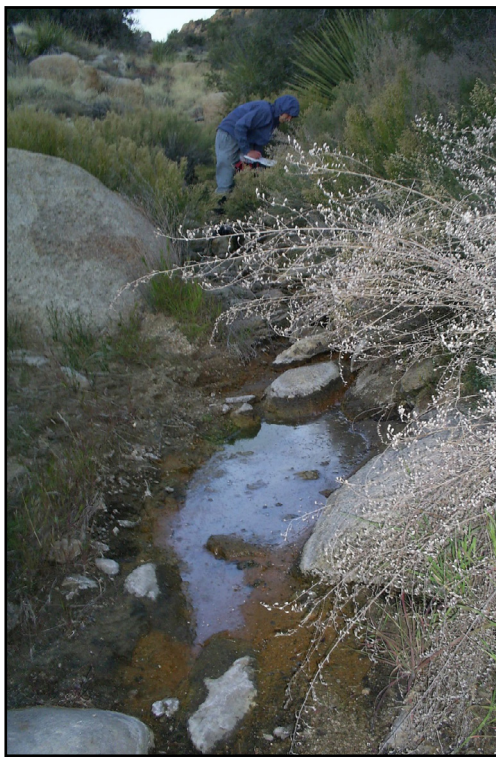
Is the amount of water changing in Joshua Tree's springs?

Southern California recently endured several years of severe drought, reducing the amount of surface water at many desert springs across Joshua Tree National Park. Drought is predicted to become more common in the coming decades, which will negatively impact spring habitats and the availability of water for wildlife within the park.

To track and determine water-level changes in Joshua Tree National Park, the Mojave Desert Network

(MOJN) Inventory & Monitoring (I&M) Program compared data from 45 desert spring monitoring sites visited during the initial springs inventory in 2006 and the 2016-2017 field season.

Of the 45 springs, 39 had surface water in 2006, while only 12 did in 2016. In other words, 60% fewer springs had surface water in 2016 compared to 2006. MOJN's continuing monitoring efforts will allow us to learn more about these changes over time.



Sparrow Spring, Joshua Tree, January 2006

This photo was taken during the initial desert springs inventory on January 15th, 2006. Surface water was present at the spring during the visit.



Sparrow Spring, Joshua Tree, February 2017

This photo was taken during the recent JOTR desert springs monitoring field season on February 8th, 2017. No surface water was present during the visit.

Overview of the Desert Springs Monitoring Protocol

The MOJN I&M monitors the health of nearly 500 desert springs across six network parks through its Desert Springs Monitoring Protocol.

To accomplish this, field crews collect data at 120 springs each field season. Some springs are monitored every year (including 10 springs in Joshua Tree National Park), while other springs are monitored on a three-year rotating cycle.

At each spring, field crews measure water quantity and quality, including spring flow, water temperature, dissolved oxygen, pH (acidity), and specific conductance (amount of dissolved salts in the water). Water quality affects the distribution and diversity of plant and animal communities at springs.

Field crews also perform a site condition assessment to record the presence of natural or human disturbance, the occurrence of native and invasive plants, and evidence of spring use by wildlife. Additionally, photos are taken to track visual changes of the spring over time.



A handheld multi-probe is used to collect water quality data. These measurements give us an idea of how healthy the spring is. Monitoring water quality on a regular basis allows us to detect changes in spring health over time.

Comparing presence of water at desert springs: 2006 versus 2016

Monitoring data revealed a significant decrease in springs showing surface water between the two visits. There was above average rainfall in 2005, which may have contributed to the greater amount of water observed during the 2006 inventory. By contrast, the late 2016 monitoring occurred after years of severe drought in southern California. Climate change is expected to cause more frequent and severe drought in the southwest over the next century¹.

The data collected by MOJN may provide a glimpse of what a drier future holds for desert springs in Joshua Tree. Decreases in available

water at Joshua Tree springs will have negative consequences for the wildlife that live there:

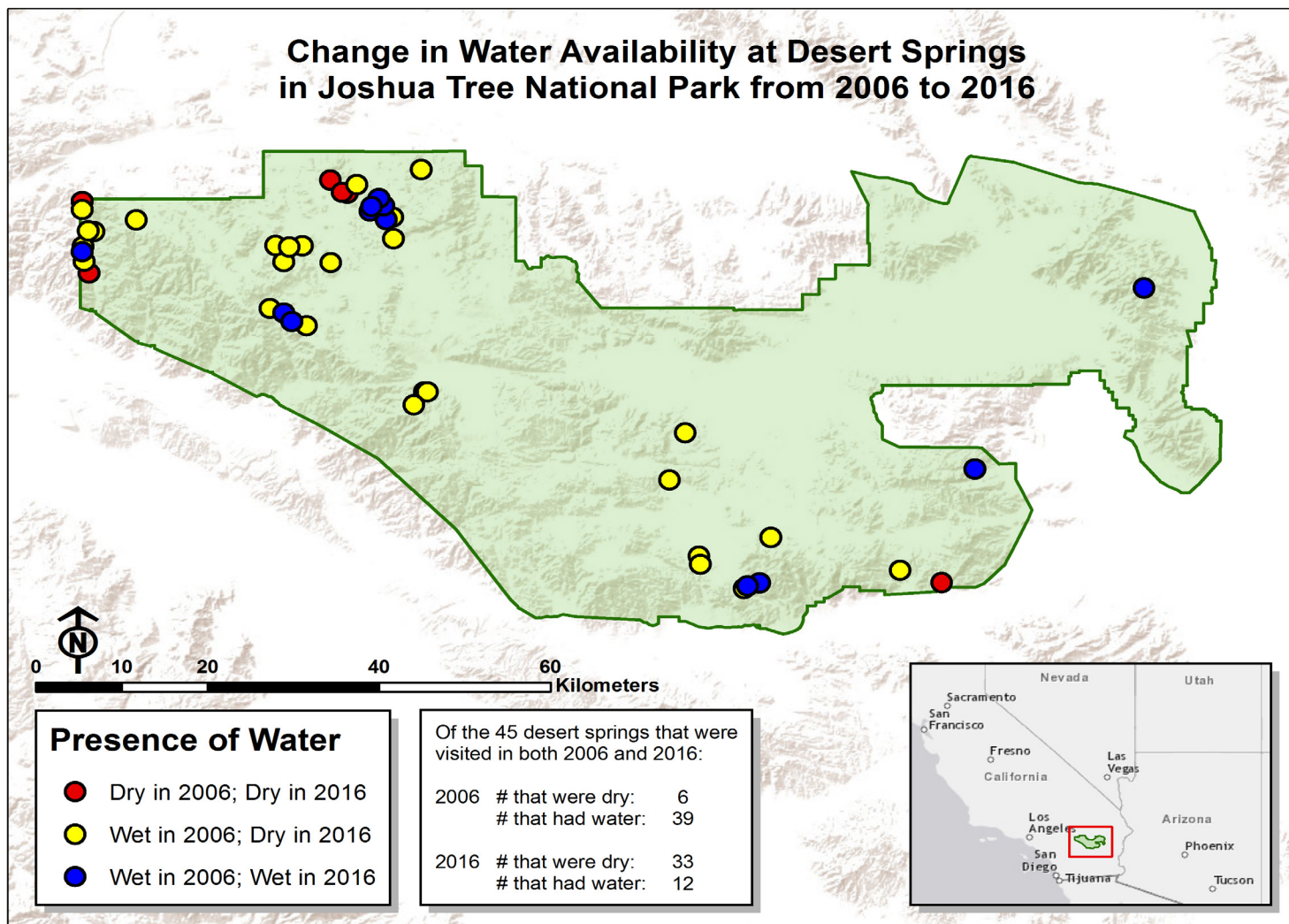
- Especially during the hotter summer months, springs often provide the only source of water for many animals, from bighorn sheep to tree frogs.
- The vegetation found at springs serves as food and habitat to many animals. If there is less water available, there are fewer plants to provide food and shelter to these animals.

Additionally, more than 75% of wildlife in the Mojave Desert heavily depend on spring and stream vegetation to survive,

including 80% of the birds and 70% of the butterflies².

If more springs go dry and stay dry for longer periods of time, this decrease in available water will affect the health and distribution of plants and animals throughout the park. We want to know which springs are the most robust and which are most at risk so that natural resource managers at Joshua Tree can make informed decisions to preserve these sensitive environments and the wildlife that depend on them.

Change in Water Availability at Desert Springs in Joshua Tree National Park from 2006 to 2016



Citations:

¹Cayan, D. R. et al. 2010. Future dryness in the southwest US and the hydrology of the early 21st century drought. *Proceedings of the National Academy of Sciences*. Vol. 107, no. 50: 21271-21276.

²Brussard, P. F., D. A. Charlet, and D. S. Dobkin. 1998. The Great Basin-Mojave Desert Region. Pages 505-542 in M. J. Mac, P. A. Opler, C. E. Puckett-Haecker, and P. D. Doran, editors. *The status and trends of the nation's biological resources*. U.S. Geological Survey, Reston, Virginia.