

# Mojave Desert Network Climate Change Resource Brief

Pacific West Region  
Inventory & Monitoring  
National Park Service  
U.S. Department of the Interior



## Climate Change and the Mojave Desert

Desert ecosystems are sensitive indicators of climate change because small changes in temperature and precipitation (quantity, timing, frequency, and distribution) can have significant effects on physical resources and biological communities. Mojave Desert Network is currently developing protocols to monitor several Vital Signs that may reflect current and future impacts of climate change.

## Groundwater and Springs Monitoring

Within Mojave Desert Network parks, significant biodiversity may be found at springs, which range from small, ephemeral mountain-front springs to large, perennial springs fed by carbonate-rock aquifers. Because the quantity of water (discharge) flowing from small mountain-front springs is affected by precipitation patterns, climate change may affect these springs and the associated plant and animal communities that depend on each spring's discharge patterns. At a selected subset of these springs, this network will monitor discharge, water quality, and the associated macroinvertebrate, riparian plant, and bird communities.

## Streams and Lakes Monitoring

Diverse landscapes within the Mojave Desert Network also encompass high mountain streams and alpine lakes. Continuous measurements of lake level and stream discharge at Great Basin National Park may reflect changes in the amount and timing of precipitation and snow-melt. We will also monitor stream and lake water temperatures, lake ice-out and ice-over dates, and water quality, all of which may be affected by changes in air temperature and/or snow melt processes and all of which are important ecological variables.

## Vegetation Communities and Invasive Plants

The Mojave and Great Basin deserts support a wide range of upland vegetation communities from desert scrub to subalpine forest. Changing patterns in precipitation and temperature have the potential to shift the latitudinal and elevational distribution of some communities and threaten the persistence of others (e.g. Joshua tree, bristlecone pine). Changes in climate, combined with anthropogenic effects such as nitrogen deposition, may also result in the displacement of native plants by exotics, range expansions of new plant species into network parks, and the establishment of new ecological processes such as the grass-fire cycle, which is detrimental to many native plant species. The network will monitor structure and composition of selected vegetation communities and biological soil crusts to identify long-term changes which may be caused by climate change. In addition, network parks will implement early detection procedures to identify range expansions and contractions of invasive exotic plants.

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The namesake of Joshua Tree National Park, the Joshua tree (*Yucca brevifolia*), could experience significant changes in distribution due to climate change.



Climate change may affect water availability at springs and seeps, which are often the only natural water sources for plants and animals.



An increase in invasive grasses and annuals could change the desert landscape by establishing a fire cycle to which native plants are not adapted.