

# NATIONAL PARKS IN PERIL

## THE THREATS OF CLIMATE DISRUPTION

### State Fact Sheet: New Mexico

Human disruption of the climate is the greatest threat ever to our national parks.

At risk are nearly every resource and value that make our national parks so special. In *National Parks in Peril*, the Rocky Mountain Climate Organization and the Natural Resources Defense Council identify 25 national parks as having the greatest vulnerabilities to human-caused climate change. In New Mexico, Bandelier National Monument is among the 25 parks most at risk. Bandelier is vulnerable to a loss of ice and snow, a loss of water, more downpours and floods, a loss of plant communities, a loss of wildlife, and a loss of cultural resources. Other parks in New Mexico, including Carlsbad Caverns National Park and Chaco Culture National Historic Park, face similar vulnerabilities.

Many of these impacts are already happening, as human activities—the emission of heat-trapping gases—are now changing the climate. To preserve our national parks for ourselves and future generations, we need to both stop changing the climate and take actions to preserve the resources and values that make our parks special. For detailed recommendations, see the full report, *National Parks in Peril*.

#### Loss of Ice and Snow

As the climate gets hotter, national parks losing snow and ice—one of the most obvious effects of a changed climate on our national parks. Scientific forecasts for future springtime peak snowpack levels across the West are shocking. These projections typically are for snowpacks as of April 1, around the time of peak snow levels. In some parks, such as Bandelier and Chaco, snow does not linger that long, but with less snow in winter fewer visitors would get to see the parks at their scenic best. Opportunities for snow-based winter recreation like cross-country skiing and snowshoeing are likely to be extinguished in parks like Bandelier first.



To read the full report on the impacts of global warming on national parks, visit [www.nrdc.org/policy](http://www.nrdc.org/policy) or [www.rockymountainclimate.org](http://www.rockymountainclimate.org)

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#### Loss of Water

In the West, a changed climate likely will bring less snowfall, earlier snowmelt, and hotter and drier summers, reducing water availability, especially in the summer when it is most needed by wildlife, plants, and entire ecosystems. The hotter and drier conditions of the Colorado Plateau are already having dramatic effects on the piñon-juniper forests that are the region's dominant wooded ecosystem. Sustained heat and drought in the early years of this century weakened piñon pines so much that an infestation by a piñon bark beetle has caused widespread regional forest die-back. In 2002 and 2003 alone, heat, drought, and beetles combined to kill 90 percent of the piñon pines in studied portions of Bandelier. This region has known drought before and trees have died before, but more trees died in the recent drought than during an even drier period in the 1950s. The difference, researchers say, is that this century's higher temperatures increased the forest die-off. Other parks at risk of losing piñons are Carlsbad and Chaco.

## More Downpours and Floods

With a changed climate, more precipitation now comes in downpours. The amount of rain falling in heavy storms increased by 20 percent over the past century, while there has been little change in the amount from light and moderate storms. In its recent report, the U.S. Global Change Research Program says there is at least a 90 percent likelihood that heavy downpours will become even more frequent and intense. With an increase in downpours, flooding also is likely to increase. Virtually all national parks in New Mexico and elsewhere are at risk, as the forecast is for more downpours everywhere.

## Loss of Plant Communities

An altered climate can lead to fundamental changes in the natural plant communities of parks, including a disruption of mountain forests and desert ecosystems. A recent U.S. government report and the Intergovernmental Panel on Climate Change point out that rising temperatures increase outbreaks of insects in forests. Bark beetles are unusual parasites in that they kill their hosts—when conditions are right, large outbreaks can occur, killing most large trees in a forest. The changing climate is also making it possible for bark beetles to spread faster and higher. Hotter and drier conditions have stressed trees, making them more vulnerable to beetle attacks. Longer, hotter summers have extended reproductive and growth periods, while fewer cold snaps and higher winter temperatures have permitted increased bark beetle survival in winter, spring, and fall, and infestation of higher elevations. As the report from a recent scientific symposium put it, “Mature forests are the loaded gun for severe bark beetle infestations, and weather is the trigger.

Ultimately, though, the forests themselves are not being lost. Post-outbreak forests will recover much as Yellowstone National Park’s forests are recovering after large fires in 1988. Still, to the extent that recent bark-beetle epidemics have spread higher, and perhaps faster and wider than previous outbreaks, it illustrates how ecosystems can be changed, on a landscape-wide scale, when one natural force (the beetle) is no longer held in natural check by another (cold weather).

A particularly ominous finding is from a team of scientists who recently found in undisturbed western forests that trees of all types and ages are dying faster than they used to. The increase in “background” tree mortality—not caused by fires, insects, wind, or any other obvious agent of forest change—was documented through examinations of census records of all individual trees in 76 undisturbed forest stands with counts of all living trees as far back as 1955. In the studied forests, eighty-seven percent of the plots had experienced an increase in the rate of tree deaths. The researchers suggested that higher temperatures and drier conditions—manifestations of a changed climate—may be the reasons for the accelerated tree deaths.

## Loss of Wildlife

For many Americans, the highlight of a trip to a national park is the wildlife they see. But a changed climate could mean less of the wildlife species now in the parks. Some species may go completely extinct, and, local populations in particular parks may be eliminated or decline sharply.

Pikas, which look like hamsters but are more closely related to rabbits, are mountaintop residents unusually sensitive to high temperatures, making them candidates as “early sentinels” to a changed climate. Researchers recently surveying 25 sites in the Great Basin (between the Rocky Mountains and the Sierra Nevada) known to have previously had pika populations failed to find any pikas in nine sites—primarily those at lower, hotter elevations. This raises concerns for the future of the species at Bandelier as the climate continues getting hotter. The U.S. Fish and Wildlife Service is now considering

whether the species qualifies for protection under the Endangered Species Act because of the threats of climate change.

Worldwide, amphibians appear to be the first large-scale wildlife victims of a hotter climate, in part because higher temperatures promote the spread of a fungus that kills amphibians. At Bandelier a decline in Jemez Mountains salamanders is thought to be the result of hotter, drier conditions.

### **Loss of Historical and Cultural Resources**

By preserving some of the best of our historical and cultural resources—buildings, landscapes, archaeological sites, and artifacts—America’s national parks provide information about the past and provide important links to the present. Many of these resources are at risk from the possible effects of a climate disrupted by human activities.

Increased downpours, flooding, and erosion likely will increase damage to ancient structures and cause a loss of artifacts. This is particularly true in arid areas, where the land is dry and hard enough that downpours are not absorbed into the soil but instead produce floods and erosion. The results can include a loss of historic and prehistoric structures and, particularly, undiscovered artifacts. In Bandelier 80 percent of the park’s archeological sites have been affected by erosion. Chaco faces similar risks.

For documentation of the sources used for this fact sheet, please see the full report, *National Parks in Peril: The Threats of Climate Disruption*, at [www.rockymountainclimate.org](http://www.rockymountainclimate.org) or [www.nrdc.org/policy](http://www.nrdc.org/policy).