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EPA United States Environmental Protection Agency

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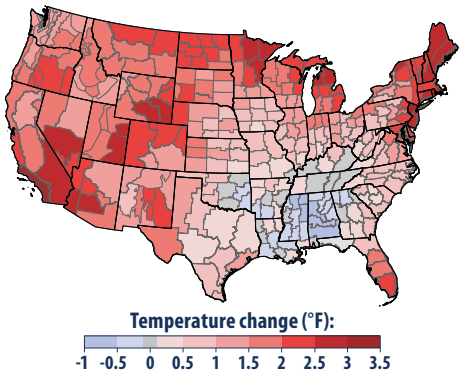
# What Climate Change *Means for* Nevada

**Nevada**'s climate is changing. The state has warmed about two degrees (F) in the last century. Throughout the southwestern United States, heat waves are becoming more common, and snow is melting earlier in spring. In the coming decades, the changing climate is likely to decrease the flow of water in the Colorado and other rivers in Nevada, increase the frequency and intensity of wildfires, and decrease the productivity of ranches and farms.

Our climate is changing because the earth is warming. People have increased the amount of carbon dioxide in the air by 40 percent since the late 1700s. Other heat-trapping greenhouse gases are also increasing. These gases have warmed the surface and lower atmosphere of our planet about one degree during the last 50 years. Evaporation increases as the atmosphere warms, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places—but contributes to drought in others.

Greenhouse gases are also changing the world's oceans and ice cover. Carbon dioxide reacts with water to form carbonic acid, so the oceans are becoming more acidic. The surface of the ocean has warmed one degree during the last 80 years. Warming is causing snow to melt earlier in spring.




*Rising temperatures in the last century. The last decade was the warmest on record in the Southwest. Source: EPA, Climate Change Indicators in the United States.*

## Snowpack

As the climate warms, less precipitation falls as snow, and more snow melts during the winter. That decreases snowpack—the amount of snow that accumulates over the winter. Since the 1950s, snowpack has declined in Nevada, as well as in the other states in the Colorado River Basin.

Diminishing snowpack can shorten the season for skiing and other forms of winter tourism and recreation. The tree line may shift, as subalpine fir and other high-altitude trees become able to grow at higher elevations. A higher tree line would decrease the extent of alpine tundra ecosystems, which could threaten some species.

## Water Availability

The changing climate is likely to increase the need for water but reduce the supply. Higher temperatures increase the rate at which water evaporates (or transpires) into the air from soils, plants, and surface waters. Irrigated farmland would thus need more water. But less water is likely to be available, because precipitation is unlikely to increase enough to make up for the additional water lost to evaporation. Annual rainfall is more likely to decrease than increase. So soils are likely to be drier, and periods without rain are likely to become longer, making droughts more severe.

*Lake Mead viewed from Hoover Dam in 2009. Decreased flows in the Colorado River have lowered the water level, which prompted the Southern Nevada Water Authority to build a new drinking water intake that could supply Las Vegas even if the lake falls below Hoover Dam's lowest outlet. © Chris Lamie; used by permission.*

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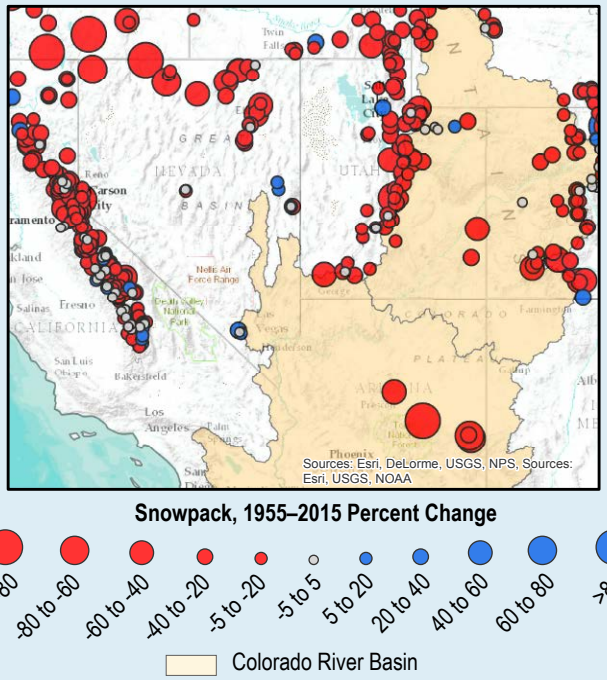
The decline in snowpack could further limit the supply of water for some purposes. Mountain snowpacks are natural reservoirs. They collect the snow that falls during winter and release water when the snow melts during spring and summer. Over the past 50 years, snowpack has been melting earlier in the year. Dams capture most meltwater and retain it for use later in the year. But upstream of these reservoirs, less water is available during droughts for ecosystems, fish, water-based recreation, and landowners who draw water directly from a flowing river.




*Trends in April snowpack in Nevada and the Colorado River Basin, 1955–2013. Snowpack has decreased at most monitoring sites. Source: EPA.*

## Agriculture

Increasing droughts and higher temperatures are likely to interfere with Nevada's farms and cattle ranches. Less water is likely to be available for ranches or farmers who irrigate crops. Hot weather can threaten cows' health and cause them to eat less, grow more slowly, and produce less milk. Livestock operations could be further impaired by fire and changes in the landscape from grassland to woody shrubs more typical of a desert.

## Wildfires and Changing Landscapes

Higher temperatures and drought are likely to increase the severity, frequency, and extent of wildfires in Nevada, which could harm property, livelihoods, and human health. On average, about 5 percent of the land in Nevada has burned per decade since 1984. Wildfire smoke can reduce air quality and increase medical visits for chest pains, respiratory problems, and heart problems.

*In 2005, the Southern Nevada Complex Fire burned more than half a million acres, making it the largest wildfire in the state's recorded history. Credit: Bureau of Land Management, Ely Field Office files.*

The combination of more fires and drier conditions may change parts of Nevada's landscape. Many plants and animals living in arid lands are already near the limits of what they can tolerate. In some cases, native vegetation may persist as the climate changes. But when drought, grazing, or fire destroy the natural cover, native plants may be replaced by non-native grasses. Because non-native grasses are generally more prone to intense fires, native plants may be unable to re-establish themselves.

## Pests

Warmer and drier conditions also make forests more susceptible to pests. Droughts reduce the ability of trees to mount a defense against attacks from pests such as bark beetles, which infested 28,000 acres of Nevada's forests in 2014. Temperature controls the life cycle and winter mortality rates of many pests. With higher winter temperatures, some pests can persist year-round, and new pests and diseases may become established.

## Human Health

Hot days can be unhealthy—even dangerous. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor. High temperatures can cause dehydration and heat stroke, and affect people's cardiovascular, respiratory, and nervous systems. Higher temperatures are amplified in urban settings where paved and other surfaces tend to store heat. Construction crews may have to increasingly operate on altered time schedules to avoid the heat of the day.

Rising temperatures can also increase the formation of ground-level ozone, a key component of smog. Ozone has a variety of health effects, aggravates lung diseases such as asthma, and increases the risk of premature death from heart or lung disease. EPA and the Nevada Division of Environmental Protection have been working to reduce ozone concentrations. As the climate changes, continued progress toward clean air will become more difficult.

The sources of information about climate and the impacts of climate change in this publication are: the national climate assessments by the U.S. Global Change Research Program, synthesis and assessment products by the U.S. Climate Change Science Program, assessment reports by the Intergovernmental Panel on Climate Change, and EPA's *Climate Change Indicators in the United States*. Mention of a particular season, location, species, or any other aspect of an impact does not imply anything about the likelihood or importance of aspects that are not mentioned. For more information about climate change science, impacts, responses, and what you can do, visit EPA's Climate Change website at www.epa.gov/climatechange.