

# THE ARIZONA REPUBLIC



## Worse drought, wildfires forecast for the Southwest

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### Story Highlights

- Colorado River flow could decline by 15 percent in second half of century.
- Vital snowpack melts away, replaced by rain that evaporates more readily.
- Region already has lost a fifth of forests.

Global climate change is baking Southwestern cities, intensifying wildfires and straining water supplies, and the worst is yet to come, scientists say in the latest National Climate Assessment released Tuesday.

The Earth is heating unevenly, and in recent decades, the Southwest has warmed by an average of 2 degrees Fahrenheit, said Gregg Garfin, a University of Arizona geoscientist who was a lead author of the report's Southwest section.

The region will heat up an additional 2.5 to 5.5 degrees by midcentury under the current trajectory of greenhouse-gas emissions, according to the report, and by up to 9.5 degrees at century's end.

Substantial emission reductions could hold midcentury warming below 4.5 degrees and end-of-century warming to 5.5 degrees.

Last June through August, the temperature in Phoenix was 95.1 degrees — an average of daily highs with nightly lows — the hottest on record.

Foremost among issues for Arizona, though, is moisture.

"In the Southwest," Garfin said, "climate change is water change."

The most basic predictions point to continued intensification of drought and a loss of mountain snowpack that feeds vital regional supplies such as the Colorado River and, within Arizona, the Salt, Verde and Little Colorado rivers.

The assessment shows that Arizona's water future could be worse than a U.S. Bureau of Reclamation report suggested in 2011.

That report used averages of various emission scenarios to predict a 9 percent reduction in the Colorado's flow by midcentury, Garfin said.

But with carbon emissions continuing as they are now, he said, the reduction of water in the already oversubscribed river is expected to reach 15 percent by the second half of this century.

Much of the reduction is expected to occur when late-winter and spring snow instead starts falling as rain, which evaporates more readily. Stressed trees transpiring more water also will contribute.

Wildfires will continue to worsen, according to the report. Because of a mixture of past forest-management practices and continuing drought, fires that once burned tens of thousands of acres in a summer now burn hundreds of thousands.

The report says that Arizona and New Mexico have lost 20 percent of their forests in the past decade and that heat, which worsens trees' drought stress, was a major factor.

"We're just revving up the risk," Garfin told *The Arizona Republic*.

For humans, temperature spikes during heat waves will turn deadly with increasing frequency, the researchers suggest.

They prescribe urban planning with an emphasis on parks and shade.

The federally backed assessment is the most extensive review to date of climate issues specific to the United States. It relied on 300 experts and a 60-member federal advisory committee. It was reviewed by federal agencies and a panel of the National Academy of Sciences.

It is the latest in a series of such assessments mandated by congressional action during George H.W. Bush's administration.

It relies on emission scenarios produced by the Intergovernmental Panel on Climate Change, as well as federal, university and other research into on-the-ground effects.

The report evoked immediate scorn from industry groups, especially toward President Barack Obama and his administration's evolving clampdown on coal-fired power-plant emissions.

"Facing a recovering, yet fragile, economy, with families across the country struggling to make ends meet, it is concerning that the Obama administration is busy promoting its politically driven

climate-change agenda, instead of addressing the real issues plaguing our nation," Laura Sheehan, a spokeswoman for the American Coalition for Clean Coal Electricity, said in a written statement.

"Instead of flying his Cabinet members around the world, President Obama and his deputies should take time to visit communities being impacted by a much more dangerous threat: this administration's costly regulatory crusade."

The libertarian Cato Institute said the assessment downplays the role of adaptation, such as increased use of air-conditioning, in reducing human health threats.

Scientists working on the report said some things that climate skeptics have said might be positive effects of warming aren't necessarily so.

Carbon dioxide and resulting increases in growing seasons could benefit Midwestern crops, University of Illinois climate scientist Don Wuebbles said. But over time, the expected radical increases in heavy rainfall and heat waves will reduce farm production.

Conserving healthy ecosystems will help provide an important buffer to the effects of climate change, said Arizona State University life-sciences professor Nancy Grimm, who contributed to the assessment.

For instance, forest health can minimize risks of catastrophic fires and the resulting impact on water sources.

"Climate change is not something off in the distant future," she said. "It is with us now."

Garfin, a lead author of the report, pointed to an effort by Flagstaff — where voters approved \$10 million in bonds to thin mountainside forests and reduce fire-related flood risks — as an important model for adaptation.

Phoenix would benefit from the same sort of treatment within the Salt and Verde watersheds, he said.