



CLIMATE ADAPTATION SCIENCE CENTERS

Formerly known as the Climate Science Centers

Rising Temperatures Impact Colorado River Resources

The economic and environmental health of the Southwest is closely tied to the Colorado River. The river supplies water to roughly 40 million people, irrigates nearly six million acres of farmland within and beyond the basin, and contributes an estimated \$26 billion each year to the region's recreational economy.

WHAT: Climate projections for the Southwest show a future marked by chronic drought and reductions in available water supply. The region has already been impacted by changing climate conditions, experiencing warmer temperatures and more intense droughts. While we know that precipitation has a major influence on streamflow, the role of temperature is less well understood. To address this need, researchers examined records of streamflow, temperature, and precipitation in the upper Colorado River basin from the past 100 years.

FINDINGS: *Rising temperatures have been playing an increasingly important role in Colorado River streamflow in recent decades, amplifying the negative effects of drought and dampening the positive effects of wet winters.*

Snow-fed rivers such as the Colorado rely heavily on winter precipitation. But warming temperatures since the 1980s have resulted in less snow accumulation and earlier snowpack melt, both of which reduce streamflow. Though climate models have suggested that temperatures could affect streamflow, this study is the first to look at historical records to see if temperature has an effect – and researchers found that it does.

SIGNIFICANCE: Given that the Southwest is already experiencing warmer and drier conditions, these results underscore the importance of including temperature in streamflow forecasts for the Colorado River. "Forecasts of streamflow are largely based on precipitation," said project lead Connie Woodhouse. "What we're seeing since the 1980s is that temperature plays a larger role in streamflow and in exacerbating drought."



WHO: **PROJECT LEAD:** Southwest Climate Adaptation Science Center, casc.usgs.gov/centers/southwest

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