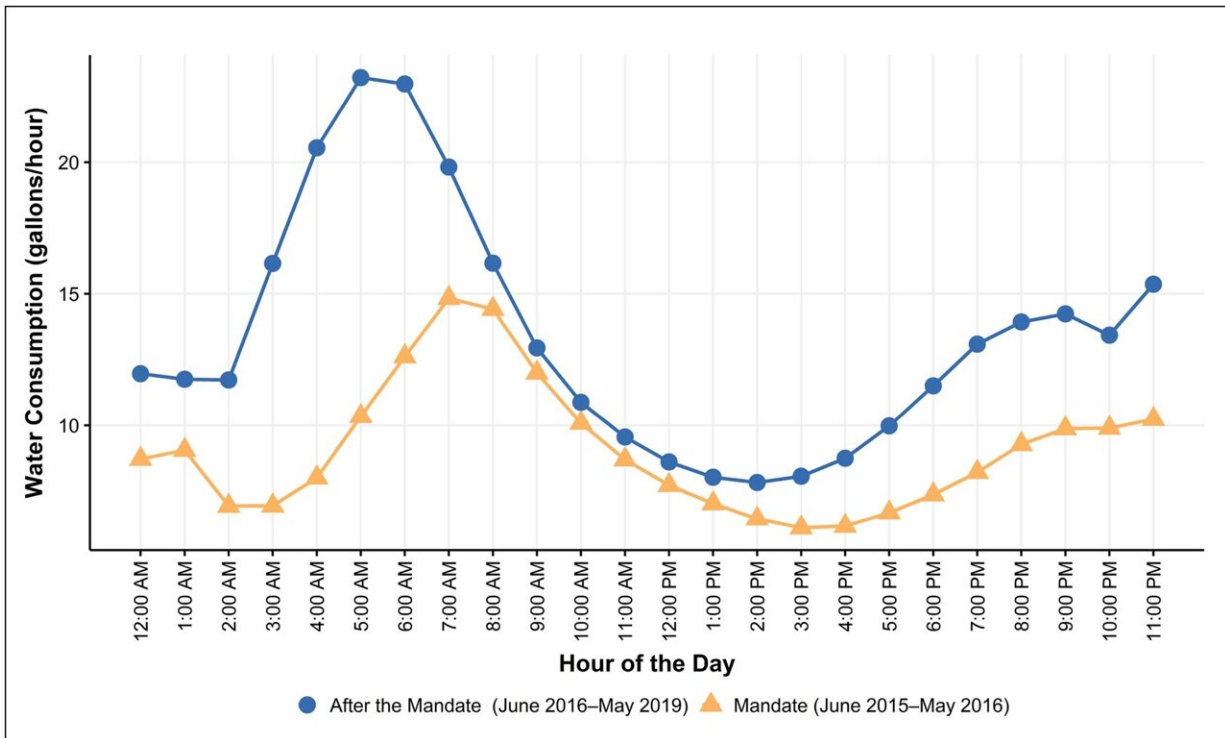


# Forced water-use cuts made California more waterwise, finds research

April 26 2023, by David Danelski



Average water consumption (gallons/hr) during (June 2015 to May 2016) and after (June 2016 to May 2019) the mandate. Credit: *Water Resources Research* (2023). DOI: 10.1029/2022WR032169

After a drought-stricken California lifted a year of mandatory water-use cuts that were effective in 2015 and 2016, urban water use crept back up somewhat, but the overall lasting effect was a more waterwise Golden

State, a University of California, Riverside, study has found.

Published Tuesday, April 25, in the journal *Water Resources Research*, the UCR study found that water use by 2019 was still lower than it was in 2013, thanks in large part to water use changes by larger water users.

The water-reduction mandate imposed in 2015 by then-Gov. Jerry Brown also spurred Californians to develop better water-saving habits, such as irrigating their lawns and gardens during cooler morning hours when less water is lost to evaporation, the researchers found. The study analyzed about half a billion records of hourly water use data.

Most of the permanent water savings came from higher-end water users, who get a greater return from investments in water efficiency.

"The higher-end water users tend to be wealthier and have larger lots," said the study's lead author, Mehdi Nemati, assistant professor of water resources economics in UCR's School of Public Policy. "They adopted technology in some way or another, and their rebound in water use was much smaller than lower-end use."

Lower-end water users—people with less income and smaller yards—tended to let their lawns go brown during the period of the water-cut mandates. So, when the mandate was lifted, these users resumed watering their lawns, contributing to a 13%–15% increase in water use compared to the mandate period—but water use was still lower in 2019 than in 2013.

The data provide new insights into Gov. Brown's controversial executive order in 2015 that required state water providers to slash the state's urban water use by 25% following three years of worsening drought. To achieve this goal, the individual urban water providers, such as city utilities and water districts, had to reduce [water consumption](#) by 4% to

36%, depending upon what water conservation measures each entity already had in place. Brown's mandate was in effect from June 2015 to May 2016.

The UCR researchers focused on granular data from a water utility in Northern California that serves about 70,000 people and were able to extrapolate the trends to the entire state with data from an ongoing statewide study, Nemati said.

The Northern California utility was required to slash its water deliveries by 32%. To do so, it offered rebates to replace grass lawns with drought-tolerant landscapes, upgrade irrigation systems, and for residences and businesses to install more water-efficient toilets and washing machines, among other water conservation measures.

Significantly, the utility also banned watering between the hours of 10 a.m. and 10 p.m., when higher temperatures outdoors increase the loss of irrigation water from evaporation.

"Consistent with best water-use practices, people moved to earlier watering hours, and continued to do so after the mandate was lifted," Nemati said. "That was one of the findings with the hourly water usage data."

Nemati cautioned that it would be more difficult in the future to achieve [water-use](#) reductions because so many higher-end water users have already invested in water efficiency.

"It is useful for the water agencies to know that we already got rid of most of our low-hanging fruit," he said.

**More information:** Mehdi Nemati et al, Residential Water Conservation and the Rebound Effect: A Temporal Decomposition and

Investigation, *Water Resources Research* (2023). DOI: [10.1029/2022WR032169](https://doi.org/10.1029/2022WR032169)

Provided by University of California - Riverside

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