

# How Much Has COVID Changed California Water Usage?

In July 2022, California Governor Gavin Newsom issued an executive order asking all residents to reduce water consumption to 15% below 2020 levels. The order aims to address continued water shortages across the state. But some experts raised concerns that the targets are not aggressive enough. Throughout most of 2020, COVID forced people to spend more time at home, causing a significant increase in residential consumption.

To have a meaningful impact, a 15% reduction would have to bring water consumption below pre-pandemic levels. But given the increase in residential water usage, would this be possible? Itron conducted a [detailed analysis of California water usage](#) data to estimate both the feasibility and potential impact of a 15% reduction.

## How COVID Changed Water Usage

From June 2018 to May 2019, California's urban regions used an average of 530 gallons per household per day (GPHD). This was split between average residential sector usage of 350 GPHD, while non-residential usage was around 180 GPHD.

From March 2020 to May 2020, Americans in California were under COVID lockdown restrictions. The result was that many workers were spending more time at home having either left their jobs, lost their jobs, or begun working remotely. Even after mandatory lockdowns were lifted in the summer of 2020, large portions of the workforce continued to log in from home one or more days per week. This has led to an expected increase in residential water usage (Table 1). At the same time, the lockdown restrictions did not lead to an offsetting reduction in non-residential water usage. As a result, urban (i.e., the combined residential and non-residential sectors) water usage increased.



From June 2019 to May 2020, total urban water usage increased to 537 GPHD, which was driven by an increase in residential sector usage of about 7 GPHD. During this period non-residential sector usage remained steady. From June 2020 through May 2021, with Californians easing into long-term remote work scenarios, residential and urban usage rose by another 20 GPHD to 377 and 557 GPHD, respectively.

Unfortunately, this increase was not offset by a proportionate decline in non-residential usage, which includes

commercial, industrial, and medical entities, among others. Rather, non-residential consumption remained relatively steady, with only modest declines. As a result, total statewide water usage increased.

## Normalizing For Weather

A simple increase in usage can be caused by many things, weather prime among them. Hotter than average months compounded with more people at home would translate into a far greater increase than had those months been cooler than normal. In addition, annual rainfall also

Year	Urban	Residential	Non-Residential
06-2018 to 05-2019	530	350	180
06-2019 to 05-2020	537	357	180
06-2020 to 05-2021	557	377	181
06-2021 to 05-2022	536	358	178

**Table 1.** This table shows the actual number of GPHD for urban, residential, and non-residential sectors in California. Residential and urban usage saw significant increases following COVID lockdowns. However, non-residential usage remained largely consistent. Despite the lifting of COVID restrictions, remote work continued to be common, resulting in continued greater residential and urban usage, which again had minimal impact on non-residential usage.

	HDD (Deg F)	Normal HDD (Deg F)	CDD (Deg F)	Normal CDD (Deg F)	Rainfall (inches)	Normal Rainfall (inches)
2017-2018	1,525	1,780	1,199	946	7.4	14.1
2018-2019	1,710	1,773	1,077	942	17.5	14.1
2019-2020	1,488	1,785	1,174	939	12.1	14.2
2020-2021	1,680	1,781	1,198	941	5.8	14.1
2021-2022	1,800	1,784	999	946	11.8	14.1

**Table 2.** This table presents a summary of actual and normal heating degree days (HDD), cooling degree days (CDD), and rainfall for all of California. The period June 2020 through May 2021 California was hotter (i.e., 1,198 CDD versus 941 normal CDD) and drier (i.e., 5.8 inches versus 14.1 inches under normal conditions) than normal, which accounts for a portion of the increase in water usage during that time.

affects residential irrigation levels, and thus has a large impact on consumption.

The question becomes, how much of the recent increase in California water usage was due to COVID and how much was due to weather? To determine this, Itron used temperature and precipitation data (Table 2) to [build a statistical model](#) that could calculate weather-normalized data. This was then used to isolate the impact of COVID on water consumption.

Normalized for weather, COVID-19 restrictions increased residential water usage by 5.1 GPHD between March and May 2020 (Table 3). The biggest impact, however, was felt from June 2020 to May 2021, with a 16.4 GPHD increase. Usage continued to be 11 GPHD above pre-pandemic levels from June 2021 to May 2022. Similarly, urban water consumption increased by 2.1 GPHD from March 2020 to May 2020, 6.8 GPHD from June 2020 to May 2021, and 4.6 GPHD from June 2021 to May 2022.

Even when accounting for weather-normalized decreases in non-residential usage, COVID still resulted in outside increases in urban usage.

### Hitting The 15% Reduction Target

Two conclusions can be drawn from this study. The first is that COVID had

a very real impact on overall water usage in California, particularly among residential communities, which saw a near 5% increase. Based on 2021-2022 figures, residents would be required to cut usage by about 57 GPHD based on non-normalized 2022 figures, or 36 GPHD based on weather-normalized consumption.

The second is that the 15% target, if successful, would bring total consumption down below pre-pandemic levels, achieving its goal. Still, the impact will be slightly less significant than it could have been had it been based on pre-pandemic usage.

The challenge that remains is how to reach the target. Barring a change in precipitation and temperature, consumers would have to either gradually return to working on-site and/or make large cuts to outdoor water use in order to come close. Water-efficient appliances, faucets, and

shower heads are also going to play a key role.

### What This Means For Water Utilities

The data shows water utilities throughout North America that, so long as a large portion of Americans are working from home full- or part-time, reducing consumption is going to prove difficult. Populations will continue to grow, and technology will continue to enable workers to log in remotely, further exacerbating this challenge.

There's no way to know if the current work-from-home patterns will remain the new normal or if workers will gradually return to the office. However, statistical models like this one can be used to analyze consumption trends and [plan for future consumption habits](#). Further, municipal leaders and policy makers can lean on such analyses to set realistic targets and develop policies and solutions for meeting those targets. ■

Year	Urban	Residential	Non-Residential
03-2020 to 05-2020	2.1	5.1	-3.0
06-2020 to 05-2021	6.8	16.4	-9.6
06-2021 to 05-2022	4.6	11	-6.5

**Table 3.** Once the impact of weather has been accounted for, one can estimate how much of California's increase in water usage is due to COVID-induced behavioral changes. Despite the June 2020 to May 2021 period being hotter and drier than normal, the larger portion of the residential and urban increases during that period can be attributed to COVID. Conversely, the weather-normalized data shows that had temperatures and rainfall been closer to normal, non-residential usage would have declined, although not enough to offset residential increases.