

To reduce water use, a California utility developed a range of customer programs that engage and educate stakeholders. By fostering cooperation to sustainably meet water demand through efficiency, the utility's efforts provide valuable lessons for many water utilities under pressure to reduce consumption.

BY ADAM WEST

# DROUGHT AND SUPPLY LIMITS DRIVE SUSTAINABILITY INITIATIVES

**I**N AN INCREASINGLY CROWDED world, water providers everywhere face new and existing challenges with more pressure than ever. If global population growth wasn't enough, climate change is expected to exacerbate weather extremes, creating more uncertainty on how to prepare for the worst.

California is no stranger to these trends, as its population is currently estimated at about 40 million, with an annual growth rate just less than 1 percent. The state also just went through a record-breaking drought that lasted five years, only to be relieved by recording-breaking precipitation between October 2016 and February 2017, filling reservoirs above historical average levels in weeks to months. This may be only short-term

relief, however, as recent studies show that California may be coming out of a wet period. Decades-long drought isn't uncommon historically, and relatively recent extremes include two "megadroughts" that lasted more than 150 years during the ninth and thirteenth centuries.

Water providers in dry climates have always understood the importance of securing water resources and have been at the forefront of water conservation efforts. However, to weather the recent drought, water providers across California pushed citizens to lower their water use as much as possible. California American Water (Cal Am) serves about 615,000 people, and its service area in Monterey has routinely been among California's top-performing areas for low water use.

Early morning light shines on the foothills and dry grasses in Monterey County, Calif., near Highway 101. Although the severely dry conditions that affected much of California starting in the winter of 2011–2012 are gone, damage from the drought will linger in many areas. The consequences of millions of dead trees and diminished groundwater basins will continue to challenge areas of the state for years. Californians responded to the drought with tremendous levels of water conservation, including a nearly 25 percent average reduction in urban water use across the state.



# Conservation

“Californians are overdrafting Mother Nature,” says Patrick Pilz, Cal Am’s manager of field operations, about the gravity of the situation. “We take more water out than rain and snowfall replenishes, and we see the resulting effects in the loss of natural groundwater storage and water quality issues.”

Pilz touches on an important aspect of sustainability: resources dwindle when communities use more than is replenished. This is evident with freshwater, as some aquifer recharge rates are on the order of centuries or millennia. As stored water reserves dwindle and populations deal with the possibility of droughts being a “new normal,” water providers across North America and around the world will need to take significant steps toward securing sustainable water supplies. Cal Am’s recent experiences offer some valuable lessons on how to deal with extreme climate variability.

## CONSERVATION EFFORTS

Cal Am’s first significant water conservation efforts started in the mid-1990s in Monterey and were driven by need when regulators determined that the utility was drawing more water than permitted from its source, the Carmel River. The utility soon became more serious about conservation in its other service areas. Over the years, Cal Am has experimented with various rate structures. By the late 1990s, it

introduced tiered rates. In 2008, Monterey was one of the first areas in California approved for decoupling rates from sales volumes, which can help address the need to more efficiently use water while keeping a utility financially sound. Most of Cal Am’s other service areas had implemented decoupling by 2010.

In 2013, nonresidential customers moved from an allocation-based rate design to one based on best management practices. After experimenting a fair amount with allotment-based rates for residents in Monterey, Cal Am recently simplified its rate structure to increase fairness and equity.

During the drought, Cal Am restricted outdoor watering and allowed grass to die, but it encouraged customers to water their trees. The utility contracted with an arborist, and customers could receive a free home visit to learn about tree watering and care. Cal Am is shifting its efforts away from indoor efficiency retrofits and toward outdoor landscape retrofits because of diminishing returns on indoor efficiency and opportunities for significant savings outside.

## PROMOTING CONSERVATION

Strategically, Cal Am is being smarter about who it targets. The utility has a much better understanding of who will benefit most from its programs. Some homeowners know little about water

conservation, whereas others are proud of their conservation efforts. Understanding where customers are within their water budget helps Cal Am target high users and make the best use of its resources. Cal Am takes several approaches to promote its conservation goals.

**Geospatial Mapping.** To help refine its targeting efforts, Cal Am recently performed a pilot study using geospatial mapping for residential and nonresidential customers. The study allows it to create a water budget based on satellite imagery and the area’s historical usage. For example, looking at the landscape and knowing the number of people in a building allows Cal Am managers to understand where usage is higher than expected.

**Advanced Metering.** In Ventura and Monterey, Cal Am has two pilot programs for advanced metering infrastructure (AMI), an integrated system of smart meters, communication networks, and data management systems that enables two-way communication between a utility and its customers. Ventura is an affluent area with large lots and lush landscapes. Consequently, it has the highest water usage of all of Cal Am’s service areas and one of the highest per capita in California. The pilot program incorporates early leak detection, which allows Cal Am to see high usage quickly. Having more information about a customer’s usage is also valuable for discussing billing inquiries and disputes.



Cal Am developed some innovative programs to help Monterey residents lower their water use as much as possible, including (from left) mulch, rain barrel, and toilet giveaway events.

PHOTOGRAPHS: CALIFORNIA AMERICAN WATER

## The recent drought affected all Californians and pushed water providers to work with their partners and constituents to reduce consumption as much as feasible.

**Water Efficiency Coaching.** For nonresidential customers, Cal Am has experience with traditional commercial water audits but has more recently switched to a water efficiency coaching program. The year-long program requires a commitment from property owners to implement recommended efficiency measures. Cal Am holds a kickoff meeting with decision makers, including the property owner and those responsible for utility bills, investment decisions, and landscape design. If the owner agrees to the program, Cal Am performs an audit, and results are presented at a second meeting. The program requires customers to read their meters every week, but they also receive monthly feedback from Cal Am.

“It creates a dialogue over the course of a year, and this personal contact helps you establish trust,” says Pilz. “You teach customers to be self-sufficient in their vigilance to water efficiency.”

The program has been successful. Although the approach takes a lot of manpower and energy, it costs about the same as a traditional water audit.

**Public Education and Stewardship Training.** Cal Am puts a lot of effort into educating customers and children about water conservation and stewardship of natural resources.

“We do a lot of classes and education events to diverse audiences,” explains Pilz. “We ask them if they know where their drinking water comes from, and only one or two can answer. There’s a surprising lack of knowledge.”

However, Cal Am’s efforts with children may have long-term benefits. The utility supports the Water Conservation Garden outside San Diego. Children learn about the journey one drop of water takes from Colorado to their taps at home. They also receive an activity kit to evaluate their family’s behavior and performance. The program takes the conversation a step further and encourages children to be stewards of the environment, highlighting how water plays an essential role in natural systems.

The utility also reaches out to landscaping companies that engage directly with its customers and leads workshops on water-efficient landscaping. The workshops are also offered in Spanish.

### LOOKING BACK AND PLANNING AHEAD

Overall, Cal Am’s water conservation efforts have been strong. The utility has had substantial support from its president and parent company American Water, and Cal Am has played a leadership role. Even if Cal Am’s efforts in Monterey were driven by need, with an order to reduce excess withdrawals, Pilz says the work “created an incredible conservation culture there.” During the drought, water providers were required to submit their numbers to the State Water Resources Control Board, and Monterey was one of the state’s leaders.

For its other service areas, the scope of Cal Am’s conservation programs is determined by authorized regional budgets from the state of California. If Cal Am has a limited budget for a program, it ensures it has low-cost education programs with dedicated staff and interns.

In the future, Cal Am may make some significant changes to its conservation efforts. For the first time since it ramped up conservation in the 1990s, the utility is proposing to reduce indoor rebate programs in its latest rate case. According to Pilz, Cal Am is approaching saturation with low-flow fixtures, and its resources can go further with landscape retrofits. This is in line with what other utilities across California are starting to do. Cal Am is also addressing additional conservation challenges.

**Retrofits and Rental Units.** One challenge for Cal Am moving forward is working with users who don’t own their property or aren’t submetered as part of a larger property. For example, Cal Am’s water-energy nexus program for low-income customers is led by a partnership of energy and water utilities who co-fund home retrofits. Customers can apply for a home retrofit that includes new toilets and showerheads

and potentially a new washing machine. This retrofit also includes a weatherization package to reduce energy costs. Although customers don’t have to be homeowners to apply, they do need approval from the property owner, which can hinder implementation. Mass-metered systems, such as those found in mobile home parks or multifamily buildings, present a similar challenge, and often tenants under these systems pay an internal water bill, whether or not they’re submetered. These tenants can greatly benefit from cost savings, and Cal Am tries to reach them even if they aren’t technically customers.

**Refreshing the Messaging.** Another challenge Cal Am faces is shifting its messaging in the wake of drought fatigue. California made significant efforts to reduce water use during the recent five-year drought, one of the driest periods on record. With one of the wettest winters on record following that last year, water restrictions have been lifted. The changes made during the drought have had long-term effects, as California’s baseline water use is lower than it was before the drought. However, water savings have slipped recently, and they’re starting to rebound.

Each month further out from the drought, Cal Am is seeing usage go up in its service areas and throughout California. During the drought, Cal Am used focus groups to understand the effectiveness of its messaging. Insights gained from the focus groups will help Cal Am address the challenge of drought fatigue and messaging in general.

**Demand Hardening.** Cal Am also faces a challenge with demand hardening. The utility conducted a study a few years ago in which it investigated price points at which customers would refuse to give up water luxuries such as long showers or rose gardens. Customers may not be willing to change certain habits in response to higher prices. However, the study’s data have helped Cal Am make better decisions and provide insights that will be useful in the future.

## Conservation



### LESSONS LEARNED

When asked what other utilities, large and small, can learn from Cal Am's experience, Pilz recommends they form relationships to learn from others. Examples include sharing programmatic content and research data so utilities can analyze and measure what's effective.

**Low-Water Landscaping.** The Metropolitan Water District of Southern California, a cooperative of 26 cities and water agencies, spent more than \$300 million a few years ago on a turf removal rebate program. Now utilities can survey those who took advantage of the program to see what worked and what could be done differently.

Similarly, Cal Am partnered with several San Diego organizations to implement a grant-funded sustainable landscape program. The program went beyond turf removal and promoted a watershed approach, encouraging rain capture, water retention, and native plantings. These projects are labor-intensive but significantly benefit the customer base. These types of projects, and many similar grassroots efforts, are occurring around the state. Partnerships have allowed Cal Am to extend its resources and learn from others that have a stake in the health of California's waters.

**Nonresidential Customers.** For those just beginning a water conservation program for the first time, Pilz recommends utilities be selective when deciding which customers to address to maximize the reach of their resources. Cal Am has faced barriers

when implementing some of its conservation initiatives. When it recommends new fixtures for nonresidential customers, the decision to implement those recommendations often relies on a return-on-investment figure. If the return on investment is three to five years or longer, the response from businesses typically isn't enthusiastic.

When working with school administrators on retrofits and demonstration gardens, Pilz notes utilities should be aware of time delays to work through and control red tape associated with annual budget cycles. Even after such projects are funded, they can still take many months to get started.


**Residential Customer Response.** On the residential side, Cal Am often encounters customers who don't want to hear about how much water they use—or how to be more efficient. During the drought, in some districts with the highest use, Cal Am implemented software that showed customers how much water they used compared with their neighbors. The software had graphics, such as smiling and frowning emojis, to reinforce low water usage and discourage high water usage. The approach created a lot of attention but also frustration. Cal Am received calls from customers saying they didn't want to be compared, didn't believe the numbers, and thought they used less than their neighbors.

**Reception and Personal Time.** The overall response to Cal Am's efforts by customers who participate in its

conservation programs has been “overwhelmingly positive,” according to Pilz. Cal Am has conservation specialists who visit homes, educate customers, and survey them about their experience. The specialists spend about an hour pointing out leaks, educating them on rebates, and administering the survey to receive instant feedback. Instead of an online questionnaire, the utility spends a lot of personal time with customers, and Pilz says he can't recall a negative outcome from a home visit. The visits can also create a snowball effect as customers become more engaged.

### SUSTAINABILITY EFFORTS PAY OFF

Beyond the efforts discussed here, Cal Am is working to increase the sustainability of its water supply through best practices in integrated water resource management. The utility recently completed an aquifer storage and recovery facility that will pump excess water collected during the winter into a seaside basin for recovery in the summer. Also, Cal Am is partnering with Pure Water Monterey, a water recycling program, to reduce withdrawals from the Carmel River and Seaside Basin and aid the natural flow of the river and fish migration. Cal Am is also proposing a desalination plant in Monterey. A low-impact test well is operating and pulls ocean water through the sandy ocean floor rather than from the open ocean. Such efforts to create a more robust and diverse water supply will substantially increase Cal Am's resilience.

As water providers navigate myriad stresses on water supply, they can learn from one another and remain open to new avenues to achieve their goals. Communities around the world depend on them to do so, because access to clean water is vital to humanity's future. 

**Editor's Note:** For more information on water conservation and sustainability, visit [www.awwa.org/conservation](http://www.awwa.org/conservation) and [www.awwa.org/community/conservation](http://www.awwa.org/community/conservation).