

Scaling Up Centralized Water Recycling

SERIES OVERVIEW

In 2022, California is in the midst of a severe drought — just a few years after the worst drought in a millennium ended in 2017.

This pattern of accelerating and deepening droughts is consistent with climate change models for the state, which forecast longer, more severe and more frequent droughts punctuated by heavy rain and flooding.

Unlike past droughts, these events are not periods to survive until “normalcy” returns. Instead, they are a sign that the climate is changing — and that the state must fundamentally change how it uses water.

These six case studies — a follow-up to SPUR and Pacific Institute’s report *Water for a Growing Bay Area* — highlight leaders who are pioneering more sustainable approaches to water in Northern California. We highlight public water agencies, private corporations, nonprofit affordable housing developers and local land use authorities who are using water more efficiently, protecting groundwater supplies, reusing stormwater and recycling water.

Water sustains life, and its status — whether it is plentiful or scarce, clean or polluted, fresh or salty — shapes the well-being of all living creatures. These six case studies illustrate strategies for California to meet the challenge of a changing climate and emerge with a healthy environment and flourishing communities.

Key Takeaways

- Recycled water is a drought-resilient and environmentally sustainable source of new supply, yet the Bay Area lags behind Los Angeles and San Diego in water recycling.
- Valley Water, the wholesaler that serves Santa Clara County, is scaling up its recycled water efforts faster than most water districts in the Bay Area. The district aims to more than double its supply of recycled water by 2040.
- Direct potable reuse — sending purified wastewater directly to a drinking water treatment plant — has the potential to accelerate the amount of recycled water used in California, because it eliminates the need to build a second set of pipes to distribute recycled water.
- Recycled water faces three major hurdles: concerns about its safety (real and perceived), the high cost of building new infrastructure, and the difficulties in crafting agreements between multiple drinking water and wastewater utilities.

Modern water systems in the developed world typically treat their wastewater to a high standard of purity — then get rid of it. In many cases, the wastewater is reused by others downstream. But in coastal areas such as the Bay Area, treated wastewater — what most people simply call sewage — has typically been discharged to the Bay or the ocean, where it’s essentially wasted. This practice is changing as water managers shift



to a “one water” perspective, in which urban wastewater is viewed as a valuable resource to be recovered rather than discarded.

Nonetheless, the Bay Area lags behind Southern California in water reuse. As of 2016, the San Francisco Bay hydrologic region obtained 2.7% of its supply from recycled water. The South Coast region, which includes Los Angeles and San Diego, acquired more than twice as much (5.5%) of its water from recycled water.¹ A review of select Bay Area urban water management plans showed that agencies plan to derive between 0% and 17% of their water supplies from recycled water by 2040 (Figure 1).

Making the South Bay a Leader on Centralized Water Recycling

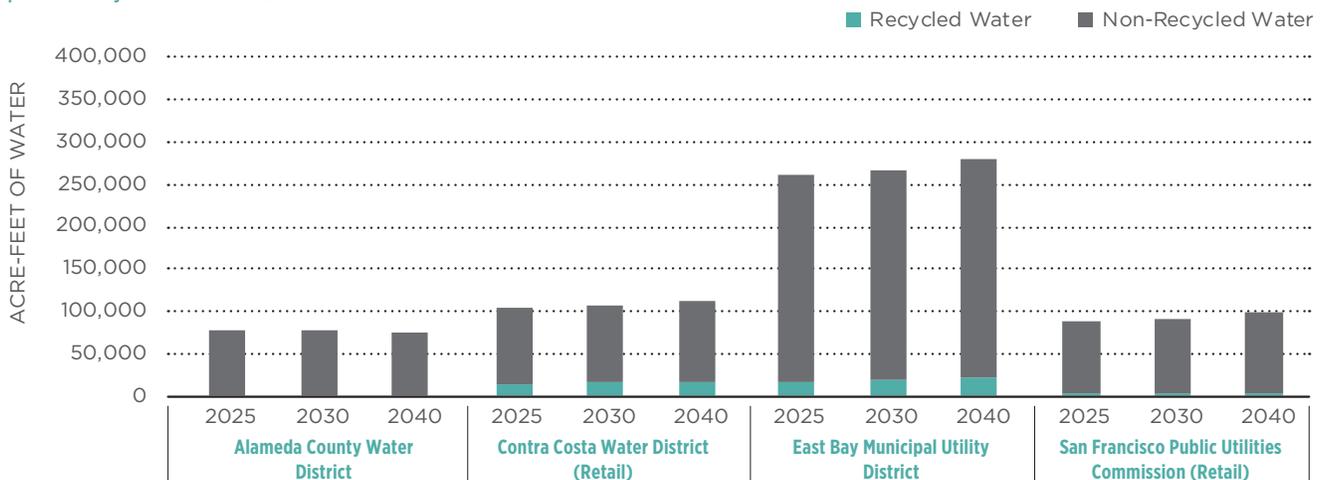
Santa Clara Valley Water District, also known as Valley Water, is one example of a Bay Area water agency that plans to increase water recycling. Valley Water’s board of directors set a goal of providing 10% of Santa Clara County’s water demands with recycled water by 2025 — an

estimated 28,000 acre-feet a year. Valley Water has also set a long-term goal of producing 57,000 acre-feet a year of recycled water by 2040, nearly doubling water recycling in 15 years.²

There are two key reasons the district is pursuing this move. First, it reduces wastewater discharges to the Bay’s sensitive ecosystem. Second, it reduces dependence on imported water. Roughly 50% of the county’s water is imported from outside the region. Imported water supplies are contingent on water availability and on complex agreements between institutions. Recycled water is a locally sourced and managed supply that can help bolster resilience to changes in the availability of imported supplies.

Valley Water’s flagship recycling program is the Silicon Valley Advanced Water Purification Center (AWPC). The AWPC serves as a pilot program for advanced treatment technologies with a vision toward potable reuse. It produces eight million gallons of water a day that is blended with other, lower-quality recycled water from the San José-Santa Clara Regional

FIGURE 1
Plans for Recycled Water Use
Large Bay Area water agencies had modest plans for recycled water as of 2015.



Source: DWR 2015 Urban Water Management Plans, Projected Table 6-9. <https://wuedata.water.ca.gov/>

1 DWR. “Water Supply and Balance Data Interface.” *California Department of Water Resources*. Accessed September 14, 2020. https://tableau.cnra.ca.gov/t/DWR_Planning/views/Water_Balance/HRSupply-UsePieChart.
2 Brown and Caldwell. *Final Countywide Water Reuse Master Plan (CoRe Plan)*. Valley Water, 2021. <https://www.valleywater.org/your-water/recycled-and-purified-water>.



The Silicon Valley Advanced Water Purification Center treats 8 million gallons a day. Santa Clara Valley Water District plans to expand the plant to produce 20 million gallons a day of highly purified water suitable for drinking.

Photo courtesy Valley Water



Wastewater Facility to enhance the quality of water for non-potable uses such as irrigation and cooling towers.³ The current Countywide Water Reuse Master Plan proposes using water from the AWPC to replenish local groundwater basins. Supplying recycled water for non-potable uses requires a separate and often costly “purple pipe” distribution system to convey recycled water.

Valley Water plans to scale up the Advanced Water Purification Center to produce about 20 million gallons per day and is exploring plans to treat the water for potable reuse. Purified water would either be used for *indirect potable reuse*, recharging groundwater aquifers used for drinking water, or *direct potable reuse*, in which the recycled water would be directly blended with drinking water supplies. The water from the AWPC would be costly, about \$2,500 an acre-foot.⁴ By comparison, other projects under consideration, such as additional conservation and stormwater projects, would cost

considerably less — about \$400 an acre-foot.⁵

Indirect potable reuse is allowed under current state regulations, while direct potable reuse is not yet permitted. The State Water Board is required to develop regulations for direct potable reuse by 2023 under Assembly Bill 574, passed in 2017. Once regulations are in place to allow direct potable reuse, water agencies face an uphill battle convincing their customers to embrace drinking recycled water. Some customer concerns are based on perceptions that recycled water is less clean than water from a river or a well — known informally as the “yuck factor.” In a pre-modern era, it was entirely justifiable to reject drinking wastewater because the bacteria and other microorganisms from human waste would make you sick. Modern treatment methods, however, effectively remove microorganisms from wastewater. But there are still lingering scientific questions about how the state will measure and regulate chemicals of “emerging concern” found in wastewater, such as pharmaceuticals

³ Bay Area Regional Reliability. *Drought Contingency Plan Appendix C*, 2017. <https://bayareareliability.com/documents>.

⁴ Santa Clara Valley Water District. *DRAFT Countywide Water Reuse Plan*, pp. 35. San José, CA, 2020. <https://www.valleywater.org/your-water/recycled-and-purified-water>.

⁵ Santa Clara Valley Water District. *Water Supply Master Plan 2040*, pp. 29. San José, CA, 2019. <https://www.valleywater.org/your-water/water-supply-planning/water-supply-master-plan>.

⁶ Drewes, Jörg E, Paul Anderson, Nancy Denslow, Walter Jakubowski, Adam Olivieri, Daniel Schlenk, and Shane Snyder. “Monitoring Strategies for Constituents of Emerging Concern (CECs) in Recycled Water: Recommendations of a Science Advisory Panel.” Science Advisory Panel convened by the State Water Resources Control Board, 2018. https://www.waterboards.ca.gov/water_issues/programs/swamp/cec_aquatic/docs/cec_ecosystems_rpt.pdf.



and personal care products. The State Water Board has developed strategies for monitoring these chemicals, but its science advisory panel has called for further testing of the methods.⁶ Treating recycled water to drinking water standards is also expensive and could increase household water bills, burdening low-income customers already struggling to pay their bills.

While expanding water reuse is a key way to improve the reliability of water supplies, there are considerable tradeoffs. The major barriers are cost and impacts to customer affordability, improving regional cooperation between drinking water and wastewater agencies, and the waiting period for new state regulations on direct potable reuse. Moving forward with reuse entails addressing and mitigating these problems to the extent possible.

Strategies to Increase Centralized Water Recycling in the Bay Area and California

Establish a regional governance structure for Bay Area water and wastewater.

Increasing water recycling is a collective action problem. It requires cooperation between drinking water wholesalers, drinking water retailers and wastewater utilities, all of whom operate under different governing bodies and have different incentives. The fragmented nature of the water sector creates unnecessary institutional barriers to expanding water reuse.

Who has authority: No existing institution has the authority to expedite or require that water wholesalers, drinking water retailers and wastewater agencies cooperate to build water recycling infrastructure. Establishing one would

require forming a new regional governing body or expanding the authority of an existing regional entity, such as the San Francisco Bay Regional Water Quality Control Board.

Move forward with direct potable reuse when it's safe and legal.

Direct potable reuse — sending water directly from the wastewater treatment plant to a drinking water treatment plant — isn't yet legal, and the state is still developing standards to regulate it. But once it is possible for water and wastewater utilities to move forward, direct potable reuse will be a game-changer for water recycling. Until then, expanding water recycling in urban settings requires building a second set of purple pipe for recycled water, which is often prohibitively expensive and logistically impossible.

Adopt statewide mandates on increased water recycling.

Rather than relying on financial incentives and voluntary adoption, the state legislature could give the Department of Water Resources authority to set binding targets for recycling water that otherwise would be wasted (such as by wastewater that is discharged to saltwater or evaporated). At present, Department of Water Resources sets non-binding targets for recycled water. The current targets are 1.5 million acre-feet by 2020 and 2.5 million acre-feet by 2030. The most recent survey of municipal recycled water indicated that California was not on track to meet those targets.⁷

Who has authority: The California State Legislature

⁷ State Water Resources Control Board, *Water Quality Control Policy for Recycled Water*, 2018. https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2018/121118_7_final_amendment_oal.pdf.

Read all the case studies at spur.org/watershedmoments



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