Clearing the Confusion on California Water: Infrastructure 101

Trying to understand California's complicated water system is no easy task. Moreover, while California's water supply is threatened by climate change,[1] Big Ag and Big Oil use and demand more than their "fair" share.[2] Understanding major users and influences governing California's limited water supply is vital in local decision-making and protecting water supplies for future generations.

Simply Put, California's Water System Is Complicated

The Sierra Nevada Mountain range on the eastern edge of California plays a large role in feeding the rivers, lakes, and aquifers that California's vast water infrastructure captures, stores, and distributes. The Sierra Nevada is also the source for up to 50 percent of the groundwater in California's Central Valley.[3] California developed an intricate set of water conveyance systems that move water from the wetter, northern regions to California's major population centers and thirsty agricultural industries in the drier Central and Southern regions[4] (see Fig. 1).

Fig 1. Highlighted Water Infrastructure in California

SOURCE: FWW analysis of state and federal project documents

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A Note on Groundwater

Groundwater plays a vital role in California's water economy, making up 40 percent of the state's water supply in any given year.[5] However, groundwater has been consistently over-pumped in California to quench the thirst of water-intensive crops promoted by Big Ag.[6] Over-pumping has been linked to land sinking (subsidence) in the agricultural regions of the San Joaquin Valley.[7] Rural residents who depend on groundwater for everyday use have seen their wells run dry in recent years, unable to defend against agricultural users and their deep wells and thirst.[8]

Main Infrastructure

Central Valley Project

The Central Valley Project (CVP) is the largest federal water project in the U.S. and draws from two major river basins, the Sacramento and the San Joaquin, with the primary purpose of irrigating California's thirsty agricultural sector.[9] Water travels from the Sierra Nevada and Cascade mountains in the north all the way to the Tehachapi Mountains near Bakersfield in the south, crossing 500 miles of canals as well as 20 dams and reservoirs.[10] These reservoirs include the Shasta (4.6 million acre-foot capacity), Trinity (2.5 million acre-feet), and New Melones (2.4 million acre-feet).[11] While the CVP manages around 9.5 million acre-feet of water, it delivers on average closer to 7 million acre-feet each year, thanks to reduced deliveries based on current water conditions. Over 70 percent goes to farmland, 9 percent to industries and municipalities, and 17 percent to wildlife refuges and fish.[12]

State Water Project

The State Water Project (SWP) is a massive, state-run storage and delivery system that transports water from Northern California to more arid central and southern regions in the state, providing domestic supply to over 27 million residents.[13] It spans more than 700 miles, including the California Aqueduct, with its primary reservoir being Lake Oroville (3.5 million acre-feet).[14] The SWP also holds around half the storage rights to the San Luis reservoir, amounting to slightly over 1 million acre-feet annually.[15] Contracted entitlements and water rights sum up to 4.2 million acre-feet and 1.1 million acre-feet, respectively, in allocations. Around 25 percent of the SWP's contracted water goes to agricultural users, while 75 percent goes to municipalities and industries.[16]

Additional Infrastructure

Colorado River Aqueduct

The Colorado River Aqueduct (CRA) is a 242-mile-long aqueduct carrying more than 1 billion gallons of water each day from the Colorado River to over 19 million residents in Southern California.[17] Lake Havasu is its primary reservoir.[18] California currently has the largest share of this multi-state conveyance project among the eight total states.[19] Water from the CRA and additional canals along the river also ends up going to thirsty crops in the Imperial Valley, where it is shared with other districts in the South via a well-established transfer agreement.[20]

Los Angeles Aqueduct

The Los Angeles Aqueduct (LAA) transports water over 300 miles from the Eastern Sierra Nevada to the City of Los Angeles,[21] providing nearly half of the city's water supply from 2016 to 2020.[22] Water availability depends in part on mountain snowfall; by 2044, the LAA may only meet 26 percent of Los Angeles' water supply.[23]

Hetch Hetchy Regional Water System

The Hetch Hetchy Regional Water System (HHRWS) supplies water to around 2.7 million Bay Area residents across San Francisco and parts of Alameda, Santa Clara, and San Mateo counties.[24] It includes three reservoirs, the largest being the Hetch Hetchy Reservoir (360,360 acre-feet) that impounds water in from the Tuolumne River.[25] Current deliveries average over 219 million gallons per day.[26]

Mokelumne Aqueduct System

The Mokelumne Aqueduct system supplies around 1.4 million Bay Area residents with up to 364,288 acre-feet annually.[27] It relies on water from the Sierra Nevada snowpack via the Pardee and Camanche reservoirs. During dry years, it can be seasonally supplemented with up to 133,000 acre-feet by the Sacramento River via the Freeport Regional water project.[28]

Closing Thoughts

California's complicated water systems are threatened by climate change and excessive water-intensive overuse by Big Ag. The expansion in recent decades of tree nuts, alfalfa, and mega dairies strains the state's limited water supply. Pouring billions into expensive and destructive projects like new dams, desalination, and the Delta Tunnel will not solve the state's water crisis. California must curb the abusive thirst and hold that Big Ag and Oil have on their water before it's too late.

Endnotes

1 Liu, Zhu et al. "Identifying climate change impacts on surface water supply in the southern Central Valley, California." *Science of the Total Environment.* Vol. 759, No. 143429. March 2021 at 2; Gamelin, Brandi L. et al. "Projected U.S. drought extremes through the twenty-first century with vapor pressure deficit." *Nature*. Vol. 12, No. 8615. 2022 at 2, 8, and 10; Huang, Xingying and Daniel L. Swain. "Climate change is increasing the risk of a California megaflood." *Science Advances.* Vol. 8. August 2022 at 8; Hoang, Raymond et al. California Natural Resources Agency. Department of Water Resources. "The State Water Project Delivery Capability Report 2023." July 2024 at 7.63 and 7.67.

2 Food & Water Watch (FWW). "Big Ag, Big Oil, and the California Water Crisis." February 2023 at 4 to 6 and 8 to 9.

3 Armengol, Sandra et al. "Isogeochemical characterization of mountain system recharge process in the Sierra Nevada, California." *Advancing Earth and Space Sciences.* Vol. 60. June 2024 at 1, 2, 18, and 21; Liu (2021) at 2 to 3.

4 California Department of Water Resources (CDWR). Center for Western Weather & Water Extremes (CW3E). [Fact sheet]. "California Precipitation." 2018 at 1; Wong, A.J. et al. "Multiscale assessment of agricultural consumptive water use in California's Central Valley." *Advancing Earth & Space Science.* Vol. 57. April 2021 at 2.

5 California Water Boards. "Groundwater Issue: Supply." Updated April 11, 2022. Available at https://www.waterboards.ca.gov/water_issues/programs/groundwater/issue_supply.html and on file with FWW.

6 FWW (2023) at 2, 6, and 12.

7 Lees, M. and R. Knight. "Quantification of record-breaking subsidence in California's San Joaquin Valley." *Communications Earth & Environment.* Vol. 5, No. 677. 2024 at abstract, 1, 5, and 8.

8 Cagle, Susie. "'Lost Communities': Thousands of wells in rural California may run dry." *Guardian.* February 28, 2020; James, Ian. "Thousands of California wells are at risk of drying up despite landmark water law." *Los Angeles Times*. September 20, 2023; FWW analysis of CDWR. Dry Well Reporting System. Accessed August 2024.

9 Stern, Charles V. et al. Congressional Research Service. "Central Valley Project: Issues and Legislation." R45342. Updated May 30, 2025 at i, 4, and 5.

10 *Ibid.* at 3 and 4.

11 U.S. Bureau of Reclamation [Fact sheet]. "California-Great Basin Region, Central Valley Project." ND at 2.

12 Stern (2025) at 5 and 6.

13 Sunding, David et al. Berkeley Research Group (BRG). Prepared for the CDWR. "The Economy of the State Water Project: Clean, Reliable, and Affordable Water for California." December 2023 at 2 and 6.

14 *Ibid.* at 2 and 6.

15 Stern et al. (2025) at 5; Sunding et al. (2023) at 2 and 6.

16 FWW analysis of CDWR. Long-Term Operations of the State Water Project — Final Environmental Impact Report. October 2024 at 2-11 and 2-12.

17 Metropolitan Water District of Orange County. [Fact sheet]. "Colorado River Aqueduct." 2022 at 1.

18 Metropolitan Water District of Southern California (MWDSC). "The Colorado River Aqueduct — Map." Available at https://www.mwdh2o.com/colorado-river-aqueduct-map; MWDSC. [Fact sheet]. "The Colorado River Aqueduct." July 2021 at 1 to 4; U.S. Bureau of Reclamation. "Projects & Facilities — Parker Dam." Available at https://www.usbr.gov/projects/index.php?id=207. Accessed September 2025 and on file with FWW.

19 Witcher, T.R. "A Canal Runs Through It: The Central Arizona Project." *Civil Engineering.* Vol. 92, No. 2. April 2022 at 27.

20 Stern (2025) at 17; San Diego County Water Authority. [Fact sheet]. "Quantification Settlement Agreement." 2020 at 1 and 2.

21 Los Angeles Department of Water & Power. "Urban Water Management Plan for the Los Angeles Department of Water & Power." 2020 at 4-1 and 4-4.

22 *Ibid.* at ES-19.

23 *Ibid.*

24 San Francisco Public Utilities Commission (SFPUC). "State of the Regional Water System." December 2024 at 1.

25 *Ibid.* at 1 and 34 to 36.

26 SFPUC. "Hetch Hetchy Regional Water System — Water Supply and Delivery Status." August 6, 2025.

27 East Bay Municipal Utility District. "Urban Water Management Plan 2020." June 2021 at 4, 20, and H-1.

28 *Ibid.* at 3, 8, 13, 14, and 18.