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Achieving Water Justice in California:

A Vision for an Equitable and Resilient Future

Achieving Water Justice in California:

A vision for an equitable And resilient future

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> “Now the people will have enough to live on. Everything that is needed is in water.”
>
> — Yurok Creation Story, How Thunder and Earthquake Made Ocean.[1]

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1 Catherine J.K. Sandoval, “Energy Access Is Energy Justice: The Yurok Tribe’s Trailblazing Work to Close the Native American Reservation Electricity Gap,” in *Energy Justice*, eds. Raya Salter, Carmen G. Gonzalez, and Elizabeth A. Kronk Warner (Cheltenham, UK: Edward Elgar Publishing, 2018), 166–207, https://doi.org/10.4337/9781786431769.00014.

Contents

List of Acronyms

BIPOC: Black, Indigenous, and People of Color
CAFO: Concentrated Animal Feeding Operation
CEQA: California Environmental Quality Act
CESA: California Endangered Species Act
DWR: California Department of Water Resources
EPA: Environmental Protection Agency
EPR: Extended Producer Responsibility
GSA: Groundwater Sustainability Agency
GSP: Groundwater Sustainability Plan
HR2W: Human Right to Water
IIJA: Infrastructure Investment and Jobs Act
IRA: Inflation Reduction Act
IWRM: Integrated Water Resource Management
MAR: Managed aquifer recharge
MWD: Metropolitan Water District of Southern California
NEPA: National Environmental Policy Act
R&D: Research and Development
SAFER: Safe and Affordable Funding for Equity and Resilience
SGMA: Sustainable Groundwater Management Act
SRF: State Revolving Fund
SWP: State Water Project
SWRCB: State Water Resources Control Board
TEK: Traditional ecological knowledge
USDA: United States Department of Agriculture
USGS: United States Geological Survey
WASC: Watershed Area Steering Committee

Executive Summary

California's water rights system is rooted in land theft and racism.[2] It facilitates unjust and unsustainable outcomes that threaten the well-being, and in some cases the survival, of people, agriculture, and ecosystems. Black, Indigenous, and People of Color (BIPOC) disproportionately receive contaminated[3] and unaffordable water.[4] BIPOC face more widespread water debt and higher debts on average.[5] Meanwhile investment funds and insurers like Manulife Financial Corp, TIAA,[6] and even Harvard's endowment[7] profit from overpumping California's diminishing groundwater, drying up domestic drinking water wells that people rely on across the state.[8] Waterways have been so fundamentally altered and unsustainably managed that some have dried up[9] while others are too warm[10] to support native species, causing fish and ecosystems to face extinction and declining health. The climate crisis exacerbates these interconnected challenges, through more extreme droughts and precipitation events.[11]

Most proposals to avert the state's water crisis neither address the climate crisis nor injustice in the water system at the scale these challenges demand. This report builds on important work already being done by movements and lays out an ambitious vision to tackle the drivers of California's water challenges — an archaic water rights system, the climate crisis, and concentrated power — head on. **Through a system of prioritizing water based on societal value, investments in climate resilience, and most importantly, community control that addresses historical power imbalances, California can secure a future in which people, agriculture, and ecosystems thrive in the face of increasing climate uncertainty.**

Water is a public good essential to the survival of people and ecosystems.

2 Kate Poole, "California's Wildly Inequitable Water Rights System," *NRDC* (blog), October 11, 2021, https://www.nrdc.org/bio/kate-poole/californias-wildly-inequitable-water-rights-system; Kimberly Johnston-Dodds, "Early California Laws and Policies Related to California Indians" (California Research Bureau, September 2002), https://www.courts.ca.gov/documents/IB.pdf.

3 "Welcome to the SAFER Drinking Water Site," State Water Resources Control Board, California Water Boards, 2023, https://www.waterboards.ca.gov/safer/; Carolina Balazs et al., "Social Disparities in Nitrate-Contaminated Drinking Water in California's San Joaquin Valley," *Environmental Health Perspectives* 119, no. 9 (September 2011): 1272–78, https://doi.org/10.1289/ehp.1002878; Clare Pace et al., "Inequities in Drinking Water Quality Among Domestic Well Communities and Community Water Systems, California, 2011–2019," *American Journal of Public Health* 112, no. 1 (January 2022): 88–97, https://doi.org/10.2105/AJPH.2021.306561.

4 Kristyn Abhold et al., *2023 Drinking Water Needs Assessment*, (Sacramento, CA: California State Water Resources Control Board, 2023), https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2023needsassessment.pdf.

5 Jackie Botts, "The Pandemic Has Accelerated a Water Debt Crisis for Households Unable to Pay Their Bills. Families Fear Water Shutoffs Are Coming," *The Counter*, February 1, 2021, https://thecounter.org/water-debt-california-households-face-water-shutoffs-pandemic/.

6 Peter Waldman, Sinduja Rangarajan, and Mark Chediak, "Groundwater Gold Rush," *Bloomberg*, April 11, 2023, https://www.bloomberg.com/graphics/2023-wall-street-speeds-california-groundwater-depletion/#xj4y7vzkg.groun.

7 Russell Gold, "Harvard Quietly Amasses California Vineyards — and the Water Underneath," *Wall Street Journal*, December 10, 2018, sec. Markets, https://www.wsj.com/articles/harvard-quietly-amasses-california-vineyardsand-the-water-underneath-1544456396.

8 Waldman, Rangarajan, and Chediak, "Groundwater Gold Rush"; "Dry Well Reporting System," My Dry Water Supply, Department of Water Resources, 2023, https://mydrywatersupply.water.ca.gov/report/publicpage.

9 "Salmon and Steelhead Habitat Loss in the Central Valley," NOAA Fisheries, accessed May 4, 2023, https://noaa.maps.arcgis.com/apps/MapJournal/index.html?appid=ceebefd9685143daa5bf30d5a7e0c7fa.

10 NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

11 Neil Berg and Alex Hall, "Increased Interannual Precipitation Extremes over California under Climate Change," *Journal of Climate* 28, no. 16 (August 15, 2015): 6324–34, https://doi.org/10.1175/JCLI-D-14-00624.1.

Thus, we **first** recommend a system of prioritizing water use based on value to society. While we present a framework for prioritization in "tiers," specific priorities and protections to meet needs should be developed in collaboration with water justice movements and communities historically excluded from water access.

- **Tier 1: Meeting Basic Needs.** Give highest priority to ensuring that water allocations meet California's Human Right to Water (water for cooking, consumption, and sanitation), facilitate a transition to climatically suitable and sustainable agricultural systems, and support healthy ecosystems.
- **Tier 2: Resilience.** Invest in water allocations and projects that increase underground water storage for dry years, water conservation, wastewater recycling, and green infrastructure approaches to help manage precipitation and climatic extremes.
- **Tier 3: Private Luxury Uses.** Reduce and restrict water uses primarily for private benefit (e.g., extractive agriculture, lawns, and golf courses), and eliminate water use entirely for fossil fuel extraction and refining.

Second, we recommend that community watershed governance boards, which should be made up to intentionally counteract historical power inequities, make water allocation decisions within each watershed in alignment with such a tiered priority system. The state should act as a check on these boards to ensure their decisions reflect such priorities.

Third, we suggest intermediate steps that can build toward this vision of a just and democratically determined water future over time. Example policies include repealing Prop 218 (which prevents utilities from charging more than the cost of service), so that utilities can implement more progressive water rate structures, and developing more equitable water governance within the Sustainable Groundwater Management Act. Industrial policy mechanisms can also shift agricultural subsidies away from more extractive systems and toward more sustainable production systems like farming underneath solar panels, ecosystem-integrated farming, and dry farming. Agricultural transitions must also advance economic and land justice. For instance, these transitions should include returning land to Indigenous stewardship, developing worker-owned farming cooperatives that prioritize BIPOC and female farmers, and pairing financial support for land-use transitions with "high-road" practices that increase labor skills and pay.[12]

State-driven actions to increase water quality standards, return lands to Tribal stewardship, and give rights to bodies of water themselves can protect and restore California's ecosystems. Public investments in wastewater recycling and groundwater recharge can improve the resilience and flexibility of the state's water supply. Centering green infrastructure and Tribal comanagement approaches can also strengthen ecosystem benefits and resilience alongside benefits for water supply reliability.

California must also increase accountability and shift incentives to reduce private luxury water uses that threaten the quantity and quality of water. For example, passing extended producer responsibility bills can make corporations and water-intensive farmers financially responsible for water they deplete or contaminate in nearby communities. The state can also set policies that reduce or ban irrigation for nonfunctional turf (turf that is not used for recreation or community events) while increasing investment in public green spaces.

12 Carol Zabin, Roxane Auer, J. Mijin Cha, Robert Collier, Richard France, Jenifer MacGillvary, Jesse Strecker, and Steve Viscelli, *Putting California on the High Road: A Jobs and Climate Action Plan for 2030* (Berkeley, CA: UC Berkeley Labor Center, 2020), https://laborcenter.berkeley.edu/putting-california-on-the-high-road-a-jobs-and-climate-action-plan-for-2030.

Water advocates, experts, and communities must discuss opportunities and risks for California's future water management with an unflinching understanding of the historical context of existing practices, current and future climate threats, and the incentives of actors with concentrated wealth and power to overuse water in pursuit of higher profits.

These recommendations come from examining the history of California's racist and profit-oriented system of water rights. That history is marked by sprawling, interlinked processes of predatory social, economic, and environmental relationships. While Spanish settlers had already begun colonizing what is now California in the 1700s,[13] the Gold Rush of the mid-1800s accelerated often violent[14] seizures of land and water.[15] The State of California legalized this theft[16] and funded militias to kill Indigenous Peoples.[17] Settlers began blasting mountainsides with water to find gold, silting up rivers in the process.[18] Soon, both large municipalities and groups of farmers, acting through irrigation districts, built large infrastructure projects — like dams, aqueducts, and canals — to capture and move water across the state. Throughout this history, a few predominantly white and male settlers cemented their claims to water rights under California's legal system and profited handsomely from controlling water.

While these settlers benefited from the new infrastructure, they went to great lengths to ensure BIPOC communities did not. Tribes had their land seized or were flooded off their land when dams were erected. BIPOC were excluded from communities with clean and abundant water for farming and drinking through a combination of redlining,[20] sundown towns,[21] overt discrimination, and deception.[22] Water infrastructure that drained lakes, reversed the flows of rivers, and blocked fish migration fundamentally altered — and devastated — ecosystems.[23]

13 "Spanish California,"California as I Saw It: First-Person Narratives of California's Early Years, 1849-1900, Early California History: An Overview, Articles and Essays, Library of Congress, accessed October 2, 2023, https://www.loc.gov/collections/california-first-person-narratives/articles-and-essays/early-california-history/spanish-california/.

14 Office of Governor Gavin Newsom, "Governor Newsom Issues Apology to Native Americans for State's Historical Wrongdoings, Establishes Truth and Healing Council," press release, June 18, 2019, https://www.gov.ca.gov/2019/06/18/governor-newsom-issues-apology-to-native-americans-for-states-historical-wrongdoings-establishes-truth-and-healing-council/.

15 Ellen Hanak et al., *Managing California's Water: From Conflict to Reconciliation* (San Francisco, CA: Public Policy Institute of California, 2011), https://www.ppic.org/publication/managing-californias-water-from-conflict-to-reconciliation/.

16 Johnston-Dodds, "Early California Laws and Policies Related to California Indians."

17 Office of Governor Gavin Newsom, "Governor Newsom Issues Apology to Native Americans for State's Historical Wrongdoings, Establishes Truth and Healing Council."

18 Hanak et al., *Managing California's Water*; NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

19 William J. Bauer, Jr., "The Giant and the Waterbaby: Paiute Oral Traditions and the Owens Valley Water Wars," *Boom* 2, no. 4 (December 1, 2012): 104–17, https://doi.org/10.1525/boom.2012.2.4.104; NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley"; Hanak et al., *Managing California's Water*; "History of the Valley," Restore Hetch Hetchy,, accessed October 2, 2023, https://hetchhetchy.org/history-of-the-valley/.

20 In the 1930s, in the wake of the Great Depression, the federal government incentivized homeownership through offering loans. In a racist practice known as redlining, areas perceived as high risk were outlined in red, or "redlined" and denied loans, which systematically excluded BIPOC from purchasing homes.

21 Sundown towns are those that excluded Black people through laws, intimidation, and violence.

22 Michael Allan Eissinger, "Re-Collecting the Past: An Examination of Rural Historically African American Settlements across the San Joaquin Valley" (DPhil Dissertation, UC Merced, 2017), https://escholarship.org/uc/item/3sd8t54n.

23 NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

Finding solutions to these interlocking and compounding problems will require ideas that move beyond the water rights regimes that settlers and investors often exploited — ruthlessly and shortsightedly — for private financial gains.

This report is not intended to outline the definitive path forward for water use in California. Instead, it aims to further a conversation about how to create an equitable and climate-adapted water future by inviting more people to think boldly and at the scale and urgency the problem requires. As this conversation unfolds, movements, along with like-minded politicians, academics, and attorneys, can continue to achieve important wins through organizing, political, and legal strategies. Their wins can meaningfully improve people's lives while building toward a more secure, resilient, and just future.

Introduction

California's freshwater supply is seriously threatened by climate change, particularly by rising temperatures, droughts, and seawater intrusion. Industrial pollution, water-intensive agriculture, and lack of adequate resilience and maintenance investments further exacerbate supply concerns and threaten livelihoods. The state's 2023 Drinking Water Needs Assessment found that about 60 percent of drinking water systems are unaffordable according to state criteria, and water systems that serve about 2 million people are failing or at risk of failing to provide adequate and reliable drinking water.[24] Low-income communities, in which more BIPOC reside, face greater affordability and pollution burdens than the statewide average.[25] BIPOC and those who live in lower-income neighborhoods also disproportionately experience utility debt and shutoffs.[26]

Furthermore, increasing water supply uncertainty in California threatens agriculture, which represents 13.7 percent of all US farm revenues, and energy production through hydropower, which provided between 7 and 21 percent of California's in-state energy generation from 2016 to 2020.[27] Climate

24 Abhold et al., *2023 Drinking Water Needs Assessment*.

25 Abhold et al., *2023 Drinking Water Needs Assessment*.

26 Hayley Smith, "Los Angeles DWP to End Water and Power Shutoffs for Low-Income Customers Who Can't Pay," *Los Angeles Times*, November 16, 2022, https://www.latimes.com/california/story/2022-11-16/l-a-to-end-water-and-power-shutoffs-for-low-income-customers-who-cant-pay; Silvia R. González et al., *Keeping the Lights and Water On: COVID-19 and Utility Debt in Los Angeles' Communities of Color* (Los Angeles, CA: UCLA Luskin Center for Innovation and UCLA Center for Neighborhood Knowledge, 2021), https://innovation.luskin.ucla.edu/wp-content/uploads/2021/04/Keeping-the-Lights-and-Water-On.pdf.

27 "2020 Total System Electric Generation," California Energy Commission, 2023,https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2021-total-system-electric-generation/2020.

change therefore also threatens California's broader water-energy-food nexus in addition to threatening safe and affordable water use.

At the same time, financiers, corporations, and industrial-scale farmers with control over huge quantities of water in perpetuity due to a racist water rights system often prosper. They can profit from water scarcity by selling water to cities, developers, or farmers, or through industrial agriculture.[28] Among owners of private wells, declining groundwater levels increase the cost of pumping that water to the surface,[29] which can result in the need for costly upgrades or well replacements,[30] while groundwater contamination can also cause significant illnesses.[31]

In 2012, California passed a law affirming a Human Right to Water (HR2W), requiring state agencies to treat "safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes" as a right for all Californians.[32] While California has taken steps to make that a reality, there is still a long way to go to ensure that right, and even further to achieve water justice. While there is no agreed-upon definition of water justice, we define justice as "making whole" harmed parties to their satisfaction and putting a system in place that prevents future harms.[33] Water justice is linked with anti-privatization movements, ensuring public water for all, and democratic water governance.

In our view, enacting water justice must be relational, participatory, equitable, and context-specific.[34] Given the inherent connection between water justice and ecological, political, and social issues,[35] we focus not only on technocratic solutions — which by themselves reproduce existing power dynamics and inequities — but on policies that shift the historical power dynamics shaping water management in California.

As consideration and implementation of California's HR2W has begun, rising income inequality, the COVID-19 pandemic, and the climate crisis have demonstrated the limitations of neoliberal policy, which prioritizes market-based approaches and privatization to address societal challenges. The election of President Biden and the passage of the American Rescue Plan, the Infrastructure Investment and Jobs Act (IIJA), and the Inflation Reduction Act (IRA) represent a shift in policy thinking toward stronger state incentives and regulations that prioritize desirable industries, higher labor standards, and an increasing focus on justice.

At the same time, the status quo water rights system has become so untenable that a wide variety of people are calling for change. Michael George, the previous Delta Master (who oversees day-to-day

28 Gold, "Harvard Quietly Amasses California Vineyards — and the Water Underneath"; Mark Arax, "A Kingdom from Dust," *The California Sunday Magazine*, January 31, 2018, https://story.californiasunday.com/resnick-a-kingdom-from-dust/; Jake Bittle, "The Water Brokers," *Grist*, May 3, 2023, https://grist.org/drought/vidler-water-company-housing-dr-horton-nevada-arizona/.

29 Jay Lund et al., "Lessons from California's 2012–2016 Drought," *Journal of Water Resources Planning and Management* 144, no. 10 (October 1, 2018): 04018067, https://doi.org/10.1061/(ASCE)WR.1943-5452.0000984.

30 Robert M. Gailey, Jay R. Lund, and Josué Medellín-Azuara, "Domestic Well Reliability: Evaluating Supply Interruptions from Groundwater Overdraft, Estimating Costs and Managing Economic Externalities," *Hydrogeology Journal* 27, no. 4 (June 1, 2019): 1159–82, https://doi.org/10.1007/s10040-019-01929-w.

31 Alan D. Woolf et al., "Drinking Water From Private Wells and Risks to Children," *Pediatrics* 151, no. 2 (January 30, 2023): e2022060645, https://doi.org/10.1542/peds.2022-060645.

32 "Human Right to Water Portal," California Water Boards, State Water Resources Control Board, 2023, https://www.waterboards.ca.gov/water_issues/programs/hr2w/.

33 Andrea Ritchie et al., "Movement for Black Lives Reparations Now Toolkit," Movement for Black Lives, May 2020, https://m4bl.org/wp-content/uploads/2020/05/Reparations-Now-Toolkit-FINAL.pdf.

34 Farhana Sultana, "Water Justice: Why It Matters and How to Achieve It," *Water International* 43, no. 4 (May 19, 2018): 483–93, https://doi.org/10.1080/02508060.2018.1458272.

35 Sultana, "Water Justice: Why It Matters and How to Achieve It."

administration of water rights related to water diversions within the Bay Delta, through which California moves water from north to south[36]) recently said that water rights are "destined to change," "built for a different set of needs," and that the water rights priority system "is an engine of systemic racism."[37] The largest agricultural irrigation agency in the country, Westlands, known for leading the fight against environmental rules that restrict water supply to farmers, has elected a new board, instead focused on water conservation.[38] And a coalition of 20 Tribal governments and environmental groups have called for major reforms to a "dysfunctional" water rights system.[39] At the same time, California experienced multiple consecutive years of low precipitation followed by flooding and a tropical storm in 2023. As the climate crisis worsens and consensus builds that necessities like water should not be distributed based on an archaic, hierarchical, and racist rights system, now is the time to outline bold and ambitious approaches for what California's future water management could look like.

Our report builds on the expertise and hard work of many people, including advocacy groups, researchers, and water management bodies. Our literature review spanned academic articles, reports from policy organizations and governments, and additional scholarly sources. We supplemented these sources with several interviews with experts including public officials, policy analysts, academics, local communities, and environmental justice groups.[40]

This report contains five sections. In the first, we interrogate the history of water management in California and how it has led to the creation of winners and losers. Second, we examine the challenges the climate crisis poses to California's water management system, as well as contemporary attempts to address climate change and historical wrongs in California's water management history. Third, we present a bold vision for what future water management in California might look like: water allocated based on societal value through democratic systems. This vision is intended as a conversation starter about the future, which advocates and organizers can amend, improve, and work toward over the coming decades. Fourth, we outline ways to implement existing policies, and suggest new policies that could tangibly benefit people and work toward our long-term vision. Finally, we conclude with a discussion of how political, organizing, and legal strategies can work to reinforce one another and build toward a just water future.

36 "Office of the Delta Watermaster,"" California Water Boards, State Water Resources Control Board, 2023, https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/.

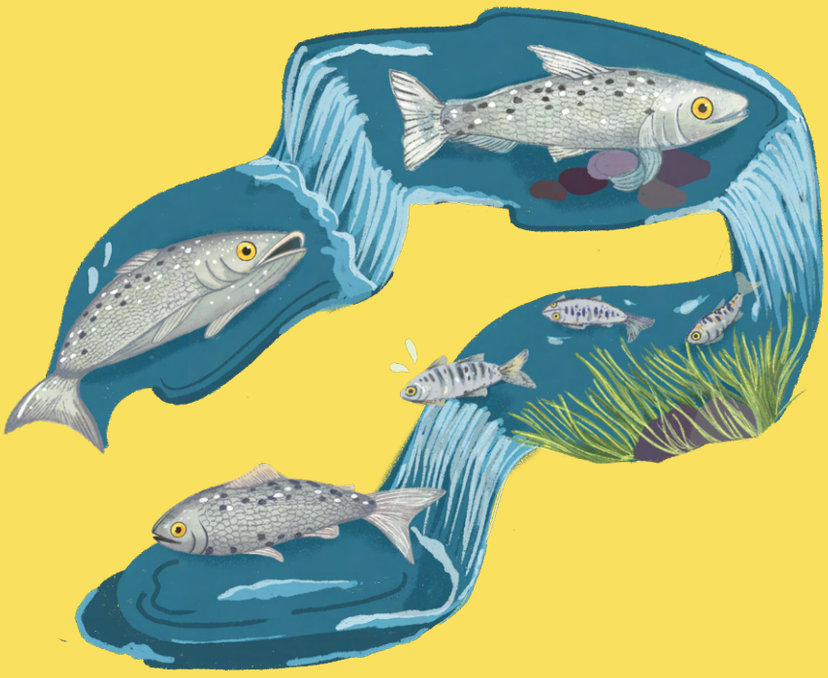
37 CA State Water Resources Control Board, "State Water Resources Control Board Meeting - January 4, 2023," January 4, 2023, Youtube video, https://www.youtube.com/watch?v=KaXMvuU4cnk.emil.

38 Dan Charles, "How California's Drought Is Changing the Politics of the Nation's Largest, Notoriously Thirsty Farming District," *KQED*, December 9, 2022, https://www.kqed.org/news/11934697/how-californias-drought-is-changing-the-politics-of-the-nations-largest-notoriously-thirsty-farming-district.

39 Olivia Wynkoop, "Coalition of Tribes, Fisheries, Environmentalists Demand Change to 'Dysfunctional' State Water Rights System," *Bay City News Service*, July 6, 2023, https://www.mv-voice.com/news/2023/07/06/coalition-of-tribes-fisheries-environmentalists-demand-change-to-dysfunctional-state-water-rights-system.

40 We name these sources to the extent and at the level of specificity we received consent to attribute their ideas. We aim to amplify movement demands without speaking for movements. We have tried to represent their work accurately and in the way they wish to be attributed, but any errors are our own.

1.
History of California Water Rights and Management



Northern California's original human inhabitants, the Klamath, Karuk, and Yurok Tribes, are known as the Salmon People: Living alongside a flowing river full of salmon, they maintained a salmon-centric way of life for thousands of years.[41] There were so many salmon, legend said that you could cross the river without getting wet if you stepped along their backs.[42] Meanwhile, in semi-arid Southern California, Indigenous Peoples including the Tongva (also known as Gabrielinos) in San Gabriel Valley and those living in what is now called the Imperial Valley near California's southeastern tip alternated between fishing during wet seasons and ecosystem-integrated dryland farming plus foraging in marshlands during dry seasons.[43] Thus, these Tribes' practices were adapted to natural climate variations and actively managed land and water through communally negotiated systems.

But when settlers arrived in what is now California (for the Spanish, as early as the 1500s), everything changed. Settlers violently displaced the Indigenous Peoples who were there, and developed large infrastructure to benefit themselves at the expense of the health of ecosystems and Indigenous communities. Since then, water management has continued to expand in ways that harm BIPOC communities. While water protections enacted in the last 50 years have provided some relief, they have been incomplete and difficult to enforce. Through the following retelling of history, we outline the historical roots that have influenced the contemporary winners and losers of California's current water management regime.

41 Lynda V. Mapes, "Course Correction," *Atmos*, March 22, 2022, https://atmos.earth/yurok-tribe-restorative-justice-klamath-river/.

42 G. H. Clark, "Fish Bulletin No. 17. Sacramento-San Joaquin Salmon (Oncorhynchus Tschawytscha) Fishery of California," UC San Diego Library – Scripps Digital Collection, 1929, https://escholarship.org/uc/item/488281qr.

43 Blake Gumprecht, *The Los Angeles River: Its Life, Death, and Possible Rebirth* (Baltimore, MD: Johns Hopkins University Press, 2001), https://doi.org/10.56021/9780801860478; Isobel Whitcomb, "The Salton Sea's Feral Splendor," *Atmos*, November 30, 2022, https://atmos.earth/salton-sea-california-drought-pollution/.

Settlement, Violence, And Displacement (~1500 to 1900)

Since the beginning of European colonization in California, resource governance has been marked by the imperative to maximize extraction and consolidate resource access for a relatively small group of powerful people, in the interest of maximizing their profits.[44] This has devastated Indigenous groups and wider ecosystems, and thus all Californians — and continues to do so.

Explicit violence and forced displacement intensified during the Gold Rush, from 1849 through the next decade, as settlers blasted the land to prospect for gold. Like the genocide and displacement of Indigenous Peoples across the United States, this was driven by predominantly white male settlers building homesteads at the expense of the people and ecosystems of California. While there were an estimated 1 million people living in the land area that would become California before settlement, this population was decimated over time. For example, from 1769 to 1900, California's Indigenous population declined from an estimated 369,000 people to less than 20,000.[45]

In 1850, the United States annexed the state of California and leveraged English Common Law tradition to declare the state government of California as the trustee for California's navigable waterways. These waterways were now considered state property and "Sovereign Lands" to be "held by the State in trust for the people" — what is known

44 Beth Rose Middleton Manning, *Upstream: Trust Lands and Power on the Feather River* (Tucson, AZ: University of Arizona Press, 2018), https://uapress.arizona.edu/book/upstream.

45 "Advocacy & Water Protection in Native California Curriculum," Save California Salmon, accessed December 24, 2023, https://www.californiasalmon.org/curriculum-advocacy-water-protectio.

as the Public Trust Doctrine.[46] The 1850 "Act for the Government and Protection of Indians" violently dispossessed Indigenous Peoples by removing them from their lands, separating children from their families, prohibiting practices like cultural burns in forests, and allowing "vagrant" Indigenous Peoples to be "hired" to the highest bidder in a form of slavery.[47] The California Land Act of 1851 (9 Stat. 631) forcibly transitioned land to state ownership.[48] This act also established the first individual property rights claims under the authority of the new government. The resulting Public Lands Commission charged with determining the validity of Spanish and Mexican settlers gave those already living on the land the burden of proving their claims to secure title.[49] Land claims that were difficult to document fell to state ownership within two years, preventing groups such as Mexican rancheros and Tribes not recognized by the federal government from maintaining rights to their existing lands.[50]

Private land claims thus became part of a system of individual property rights that privileged those who could access state government systems. Those who could claim "first in time, first in right" established enduring land and water rights on the land they settled.[51]

Further land seizure was facilitated by the Homestead Act of 1862. As of January 1, 1863, the Federal Homestead Act "granted 160 acres (65 hectares) of unappropriated public lands to anyone who paid a small filing fee and agreed to work on the land and improve it, including by building a residence, over a five-year period."[52] While this was an important route to landownership for freed slaves and single head-of-household women,[53] it entrenched settlers' practice of seizing Indigenous lands — and associated water rights. This systematic refusal to recognize prior Indigenous landholdings and the accompanying widespread violence and displacement devastated Indigenous Peoples and their ways of life, as well as set the stage for extractive agriculture, dry wells, and ecosystem destruction.

Although the US government had sent agents to negotiate land claims with Indigenous Peoples, federal negotiations were carried out erratically and were quietly never ratified. In 1905, unsigned, unratified documents were found hidden in Washington, DC, indicating that the negotiations were held in bad faith; California's government likely deemed Indigenous land and water too valuable to return when the state's economic development began to take off.[54] Meanwhile, the first governor of the state of California was openly racist (as were other settlers), calling for "a war of extermination . . . until the Indian race becomes extinct."[55]

46 "Public Engagement," California State Lands Commission, 2023, https://www.slc.ca.gov/public-engagement/.

47 Johnston-Dodds, "Early California Laws and Policies Related to California Indians"; *Act for the Government and Protection of Indians 1850*, State of California, https://calindianhistory.org/wp-content/uploads/2015/09/04_22_1850_Law.pdf.

48 UC Agriculture and Natural Resources, "Western Water: A Counter-Narrative," March 13, 2023, Youtube video, https://www.youtube.com/watch?v=iPCH9khV8DI.

49 *An Act to Ascertain and Settle the Private Land Claims in the State of California*, § U.S. Statutes at Large, Volume 9 (1845-1847), https://www.loc.gov/item/llsl-v9/.

50 Zoom interview with Nataly Escobedo Garcia, Leadership Counsel for Justice and Accountability, February 28, 2023.

51 Arthur L. Littleworth and Eric L. Garner, *California Water II*, *second edition* (Point Arena, CA: Solano Press Books, 2007).

52 "Homestead Act of 1862," Britannica, accessed March 28, 2023, https://www.britannica.com/topic/Homestead-Act.

53 "Homestead Act of 1862," Britannica, accessed March 28, 2023, https://www.britannica.com/topic/Homestead-Act.

54 West Coast Water Justice, "Water Infrastructure and Colonization in California," December 21, 2021, podcast, https://www.westcoastwaterjustice.org/1816431/9749332.

55 Claudio Saunt, "The Invasion of America," *Aeon*, January 7, 2015, https://aeon.co/essays/how-were-1-5-billion-acres-of-land-so-rapidly-stolen; Poole, "California's Wildly Inequitable Water Rights System."

The landmark 1908 Supreme Court decision *Winters v. United States* about water rights on the Milk River in Montana made clear the importance of federally recognized land claims for Indigenous subsistence. The ruling became the first to codify native peoples' rights to water. However, it tied their claims to if and when they had been federally recognized — specifically to when and where a reservation was established — and rights to water were not lost by nonuse. This meant that claims to land and associated water rights became determined by settler government recognition of individual property, disenfranchising many communities that were never recognized or were displaced prior to receiving federal recognition. To this day, the resulting Winter's Doctrine remains a partial, but critical, form of protection for Indigenous water rights.[56]

Miners were the largest early beneficiary of seized land and water. As mining scaled from panning for gold to industrial extraction, miners began moving water through thousands of miles of ditches, flumes, and canals to blast away hillsides. Miners took advantage of the ability to claim riparian and appropriative rights to seize water for their own uses. Riparian water rights granted current landowners use of flowing waters along their properties, while claims of appropriative water rights[57] allowed miners to use water in perpetuity if they proved a "beneficial use" of water for economic productivity based on a principle of "first in time, first in right."[58] This proved devastating to local ecosystems and anyone relying on the water downstream. For example, the Bear River's became so thick with sediment that the stream ceased to run on days miners used its water.[59] By the 1880s, California's legal system recognized the environmental and economic costs of mining. Two lawsuits, *Woodruff v. North Bloomfield Mining Co. (1884)* and *People v. Gold Run Ditch & Mining Co. (1884)*, limited the use of hydraulic mining, declaring it a nuisance and subordinate to public interest in navigation, commerce, and agricultural development.[60]

Those who held riparian rights and what are known as pre-1914 appropriative "senior water rights'' for surface water — water that collects on the surface of the ground, such as in lakes and rivers, as opposed to groundwater, which collects underground — used the water in other ways and passed down water rights such that current water rights holders are primarily the descendants of these colonizers from the 1850s.[61] This largely remains the case today despite a 1976 amendment to California's constitution that: "[T]he general welfare requires that the water resources of the state be put to beneficial use to the fullest extent of which they are capable."[62]

The influx of settlers during the Gold Rush, the subsequent annexation of the state of California, and access to virtually free land for settlers generated a population boom that accelerated the demand for energy and mass agriculture via intensive

56 Save California Salmon, "Advocacy & Water Protection in Native California Curriculum."

57 For an overview of water rights designations and types, see: https://aic.ucdavis.edu/events/outlook05/Sawyer_primer.pdf.

58 Arthur L. Littleworth and Eric L. Garner, California Water II, second edition (Point Arena, CA: Solano Press Books, 2007).

59 W.H. Chamberlain and H.L. Wells, History of Sutter County, California (Oakland, CA:Thompson and West, 1879) (Reprinted By Howell-North Books, Berkeley, CA, 1974); NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

60 Kaitlin N. Vigars, "Buried Beneath the Legislation It Gave Rise to: The Significance of Woodruff v. North Bloomfield Gravel Mining Co.," Environmental Affairs 43, (February 2016), https://lira.bc.edu/work/sc/00070195-0a4a-4c2b-9e21-2ba85eba87ac; "Gold Run Case," Sacramento Daily Union, November 28, 1884, https://cdnc.ucr.edu/?a=d&d=SDU18841128.2.2&e=-------en--20--1--txt-txIN--------.

61 Poole, "California's Wildly Inequitable Water Rights System."

62 "ARTICLE X WATER [SECTION 1 - SEC. 7] CALIFORNIA CONSTITUTION," accessed April 4, 2023, https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=CONS&article=X.

irrigation during the late 1800s.[63] This hastened the development of extractive technologies and massive infrastructure to transform natural resources into private profits and state-funded development. Specifically, in 1887 the Wright Irrigation District Act allowed for the development of large-scale public agency irrigation systems, which built dams and reservoirs to bring surface water from lakes, streams, and rivers hundreds of miles from one part of the state to another. This paved the way for water-intensive agriculture and permanent crops, starting with citrus. The invention of the deep well turbine pump in 1897, which allowed for extraction of deep groundwater, also aided the growth of water-intensive agriculture in arid regions.[64] Groundwater pumping remained unregulated until 2014, allowing landowners to over-extract this limited resource at the expense of nearby communities, leading to dry wells,[65] increased contaminant concentrations,[66] and severe illnesses, especially in children.[67] In California today, BIPOC and those reliant on domestic wells experience higher levels of arsenic, nitrate, and other drinking water contaminants.[68]

Leading up to the 20th century, the foundation had been laid for rapid growth of urban centers and industrial-scale agriculture through the extraction of surface water and groundwater. California displaced various forms of communally negotiated water use, such as the Spanish Zanja system, in which people had equal water access and everyone shared in maintaining a system of ditches to distribute water,[69] and replaced such systems with individual property rights for land and water, a trend accelerated by a shift toward industrial extractive technologies.[70] Many settlers amassed fortunes off of land taken from Indigenous Peoples that settlers had acquired at minimal economic — but untold human and environmental — cost.

This allocation of water rights based on narrow, extractive definitions of "beneficial use" isolated the value of water in economic terms, minimizing considerations for sustainable management of a limited resource required for the survival of healthy ecosystems and subsistence in California. Stories of Indigenous displacement and the potential for technology and state-funded development to "conquer nature" would only further extend throughout the period of development that followed in the 1900s.

The Development Period (~1900 to 1980)

Confronted by an arid landscape with little rainfall in Southern California — but roaring rivers in Northern California — those who sought to conquer the state's challenging landscape had to use different methods for irrigation and conveyance to propel urban and industrial development. This effort unfolded largely

63 Littleworth and Garner, California Water II.

64 Littleworth and Garner, California Water II.

65 Department of Water Resources, "Dry Well Reporting System."

66 Melissa A. Lombard et al., "Assessing the Impact of Drought on Arsenic Exposure from Private Domestic Wells in the Conterminous United States," Environmental Science & Technology 55, no. 3 (February 2, 2021): 1822–31, https://doi.org/10.1021/acs.est.9b05835.

67 Woolf et al., "Drinking Water From Private Wells and Risks to Children."

68 Pace et al., "Inequities in Drinking Water Quality Among Domestic Well Communities and Community Water Systems, California, 2011–2019."

69 Vincent Ostrom, Water & Politics: A Study of Water Policies and Administration in the Development of Los Angeles (Anderson & Ritchie, 1953); Esther Grace Kim, "Restoring a River to Reclaim a City?: The Politics of Urban Sustainability and Environmental Justice in the Los Angeles River Watershed" (DPhil Dissertation, UC Berkeley, 2017), https://escholarship.org/uc/item/46p657nv.

70 Kim, "Restoring a River to Reclaim a City?"

from 1900 to 1980, and can be referred to as the Development Period.[71] The policies enacted during this period created massive infrastructure that destroyed natural systems and Tribal lands; stole water from smaller, less-powerful communities; and created much of the material infrastructure that entrenches inequities today.

The beginning of this process can be traced back to the creation of the Bureau of Reclamation in 1902. The Bureau of Reclamation was a federal administrative body that funded large-scale water infrastructure projects like dams and canals to accelerate development in the West (Today, the Bureau of Reclamation runs programs and activities to balance the multitude of competing water uses in the American West).[72] Irrigation proponents like William Smythe, who founded the national irrigation congress movement,[73] felt they had a divine calling to settle — and irrigate — the West. Smythe's language echoed the ethos of Manifest Destiny when he said in 1905 that "Irrigation . . . is a religious rite."[74]

Until 1914, water rights had been obtained primarily by white men, since most women and people of other races could not own property.[75] These rights could be claimed by simply tacking a sign to a tree next to a river. After 1914, the State Water Resources Control Board (SWRCB) administered and regulated appropriative water rights for surface water claimed from this point forward. However, groundwater, riparian, and pre-1914 appropriations were — and remain — functionally outside its authority.[76] The passage of SB 389 in October 2023 gives the SWRCB more authority over pre-1914 rights, but it remains to be seen how the SWRCB uses that power. Because of the SWRCB's minimal authority over pre-1914 rights historically, these senior rights holders have not faced the scrutiny of water governance bodies' permitting. These senior water rights also remain largely unchanged from their original distribution. In this way, for example, Gold Rush settler Will S. Green's 1883 claim to water — he posted a sign on an oak tree claiming rights to millions of gallons of water per minute — lives on as the legal basis of Glenn-Colusa Water Irrigation District's prioritized water use, allowing landowners in the district to continue growing water-intensive crops like rice even during a drought.[77]

Communities displaced by dams or other water projects suffered consequences that continue to affect them today. These areas faced habitat destruction and loss of cultural ground and livelihoods, and Indigenous lands and people were sacrificed for seasonal water storage and flood protection for downstream communities.[78] California's water infrastructure — both physical and bureaucratic — has failed to rectify the harms produced in its past.

71 Timothy Quinn, *Forty Years of California Water Policy: What Worked, What Didn't, and Lessons for the Future* (Stanford Digital Repository), 2020, https://www.agri-pulse.com/ext/resources/Forty-Years-of-California-Water-Policy_Timothy-Quinn-Final.pdf.

72 "About Us," Bureau of Reclamation - About Us, Bureau of Reclamation, January 7, 2020. https://www.usbr.gov/main/about/.

73 Lee, Lawrence B. "William Ellsworth Smythe and the Irrigation Movement: A Reconsideration." Pacific Historical Review 41, no. 3 (1972): 289–311. https://doi.org/10.2307/3637860.

74 UC Agriculture and Natural Resources, "Western Water."

75 Poole, "California's Wildly Inequitable Water Rights System."

76 Clifford Lee et al., *Updating California Water Laws to Address Drought and Climate Change* (Sacramento, CA: Planning and Conservation League, February 3, 2022), https://www.pcl.org/media/2022/02/Updating-California-Water-Laws-to-Address-with-Drought-and-Climate-Change.pdf.

77 Ari Plachta, "Many California Farmers Have Water Cut off, but a Lucky Few Are Immune to Drought Rules," *Los Angeles Times*, August 29, 2021, sec. California, https://www.latimes.com/california/story/2021-08-29/rice-farmers-water-rights-drought-california.

78 Manning, *Upstream*.

URBAN CONSOLIDATION AND WATER PROSPECTING

> "The time has come . . . we shall have to supplement the supply [of water] from another source."
>
> (Los Angeles Department of Water and Power, 1904 report)[79]

From 1901 to 1923, municipalities prospected Northern California and the Sierra Nevadas to source water. Wielding their power and using violence, they overpowered smaller communities and Tribes to seize their water. Settler economic hubs with large populations, like San Francisco and Los Angeles, eventually consolidated into powerful bodies that played important roles in water politics and infrastructure construction. As cities faced increasing pressure to secure water rights for their constituents, they went scouting for surface water — taking from Indigenous Peoples, other states, and Mexico.

Los Angeles politicians used political maneuvers, lies, and influence with the Bureau of Reclamation to construct a large aqueduct from the Owens River in eastern California to Los Angeles. In 1913, William Mulholland completed the construction of the aqueduct, much to the anger of Owens Valley residents, including the oft-overlooked Paiutes,[80] who relied on the river for their agricultural livelihoods. Though Owens Valley residents fought back, exploding portions of the aqueduct with dynamite in a series of attacks, Los Angeles's power eventually overwhelmed them and the aqueduct remained. By the late 1920s, Owens Lake was completely drained,[81] most agriculture had ceased in the region, and the valley began experiencing desertification that continues to this day.

After completing the Los Angeles Aqueduct, Mulholland searched for another surface water source to meet rising demand, and found the Colorado River on the state's eastern border. In 1928, when the Metropolitan Water District Act allowed cities and other government bodies to join together to develop regional water supplies, the Metropolitan Water District (MWD) of Southern California organized as a public corporation.

The building of the Colorado River Aqueduct became possible in 1922 after California secured senior water rights to the Colorado River through the Colorado River Compact, an agreement with the six neighboring states of Colorado, Utah, Wyoming, New Mexico, Arizona, and Nevada. A large, sprawling, and technically impressive feat, the aqueduct was mired in conflict from the start. When California began building the Parker Dam in 1934, without proper permits, to supply water to the Colorado River Aqueduct and then to the southern half of the state, Arizona deployed a two-boat "navy" to block construction before the Supreme Court issued an injunction allowing the project to continue.[82] As with many decisions made in the Development Period, the Colorado River Compact did not consider Indigenous peoples, whether by excluding them intentionally, assuming they would be gone, or forgetting them

79 Marc Reisner, *Cadillac Desert: The American West and Its Disappearing Water* (Rev. and updated New York, NY: Penguin Books, 1993).

80 Bauer Jr., "The Giant and the Waterbaby."

81 "Owens Lake," Los Angeles Department of Water and Power, 2023, https://ladwpeasternsierra.com/owenslake.

82 Clay Thompson, "Avast Ye Scalawags: The Extremely Brief History of the Arizona Navy," *The Arizona Republic*, April 12, 2014, https://www.azcentral.com/story/claythompson/2014/04/12/arizona-navy-battle-with-california-colorado-river/7425253/; Nadine Arroyo Rodriguez, "Did You Know: Arizona Navy Deployed In 1934," *KJZZ*, November 22, 2013, https://kjzz.org/content/11126/did-you-know-arizona-navy-deployed-1934.

altogether.[83]

The MWD completed the Colorado River Aqueduct, which supplies water to Southern California via a 242-mile-long aqueduct, in 1941.[84] The Colorado River Aqueduct paved the way for Los Angeles's post-war manufacturing boom in the aerospace, automobile, and defense industries. But as companies in the area began storing and disposing of waste, contaminants entered the nearby San Fernando Valley groundwater basin and turned it into a Superfund site (the EPA's designation for the most polluted areas), making this water source largely unusable to this day.[85]

While Los Angeles focused on water conveyance, in the early 1900s, San Francisco's chief engineer, Michael Maurice O'Shaughnessy, settled on a plan[86] to dam and flood the Hetch Hetchy Valley, called Iyaydazi in the Paiute language.[87] The city hoped this project would protect water at its source, generate hydroelectric power, and deliver its water through a gravity system.[88] For thousands of years, the Hetch Hetchy Valley had been home to, and stewarded by, nearly a dozen Indigenous Tribes, including the Washoe, Miwok, Yokuts, and Paiute.[89] It was also part of Yosemite National Park, yet despite fierce opposition from preservationists like John Muir and the newly formed Sierra Club[90], Congress eventually passed the 1913 Raker Act, which provided authorization for the dam,[91] felling trees for lumber, and drowning sacred sites of the Miwok people.[92]

MASSIVE NEW INFRASTRUCTURE FOR WATER

"The State Water Project... [has offered] one of the country's foremost examples of socialism for the rich."

(Marc Reisner, Cadillac Desert)[93]

"We should not relax until every drop of fresh water has been put to work!"

(1944 California Governor Earl Warren)[94]

83 Rachel Monroe, "How Native Americans Will Shape the Future of Water in the West." The New Yorker, January 27, 2023, https://www.newyorker.com/news/letter-from-the-southwest/how-native-americans-will-shape-the-future-of-water-in-the-west.

84 The Colorado River Aqueduct," Explore Metropolitan, accessed April 4, 2023 https://mwd.maps.arcgis.com/apps/MapJournal/index. html?appid=a5e959ec1c544e1cbeaf63d6ecd56128&classicEmbedMode.

85 Hayley Smith, "Drought-Ravaged L.A. Seeks Surprising Source of Water: A Contaminated Superfund Site," Los Angeles Times, December 12, 2022 https://www.latimes.com/california/story/2022-12-12/los-angeles-looks-to-a-contaminated-aquifer-for-new-water; "Economy of Los Angeles," Britannica, accessed April 11, 2023, https://www.britannica.com/place/Los-Angeles-California/Economy.

86 Hanak et al., Managing California's Water.

87 Examiner Staff, "Hetch Hetchy Series: A Valley Drowns, a City Thrives," San Francisco Examiner, June 25, 2012, https://www.sfexaminer.com/news/hetch-hetchy-series-a-valley-drowns-a-city-thrives/article_2cc5dbaa-15da-575c-807e-75608937a901.html; Restore Hetch Hetchy, "History of the Valley."

88 Hanak et al., Managing California's Water.

89 Restore Hetch Hetchy, "History of the Valley."

90 Hanak et al., Managing California's Water.

91 Examiner Staff, "Hetch Hetchy Series."

92 Mel Baker, "John Muir, Racial Politics and the Restoration of Indigenous Lands in Yosemite," San Francisco Public Press, May 26, 2022, https://www.sfpublicpress.org/john-muir-racial-politics-and-the-restoration-of-indigenous-lands-in-yosemite/.

93 Reisner, Cadillac Desert.

94 UC Agriculture and Natural Resources, "Western Water."

Federal, state, and local governments have built separate systems of dams, reservoirs, and conveyance facilities to move water to cities and farms and provide flood protection. This map shows the largest such facilities. The map does not include reservoirs owned by private electric utility companies.

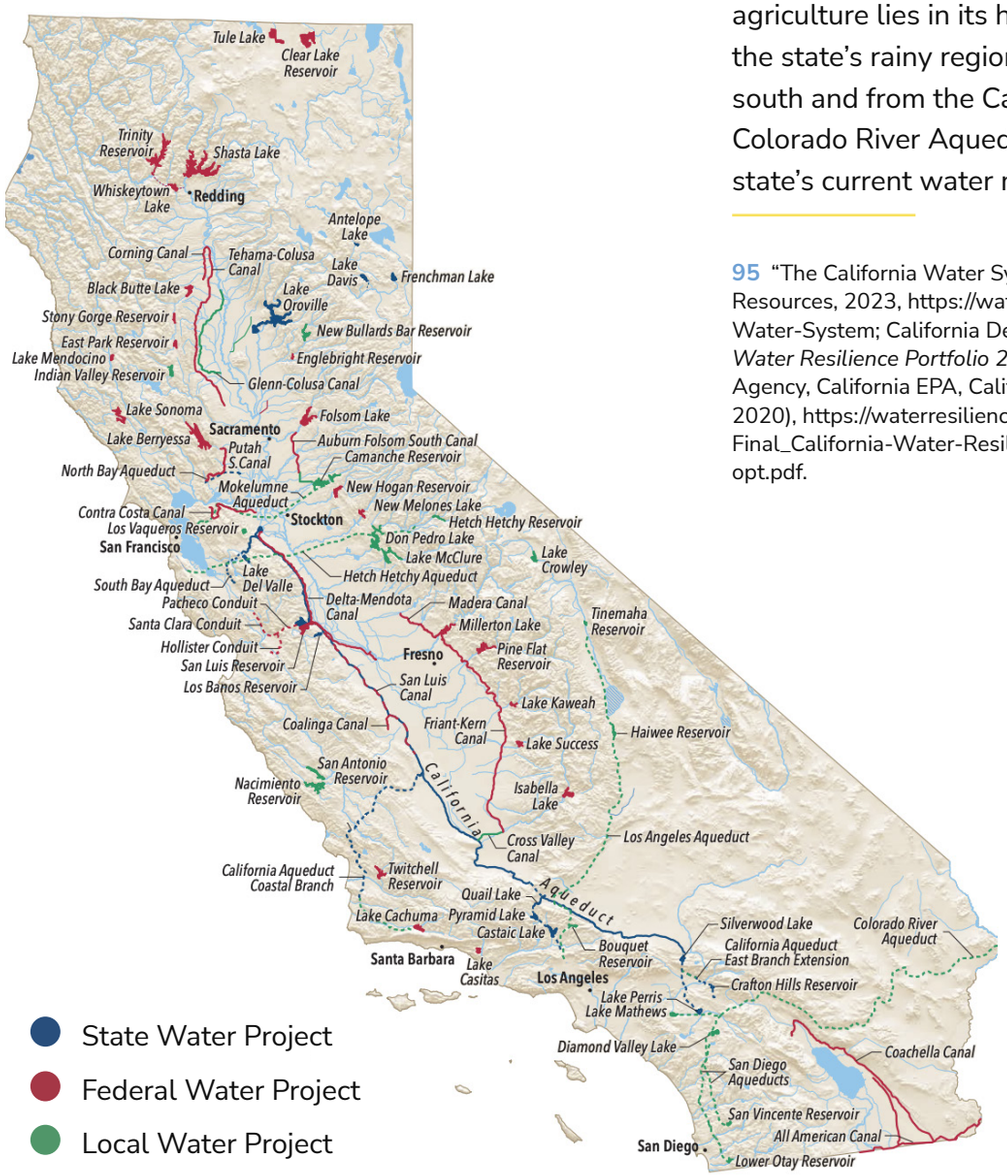


Figure 1. California's sprawling water conveyance network

Source: California Department of Water Resources (2020).[96]

Throughout the 1900s Development Period, the focus of infrastructure development and conveyance management was on using surface water. Conveyance of water was, and remains, a critical component of surface water management, as California receives about 75 percent of its precipitation north of Sacramento while almost three-fourths of its population lives in or south of the Bay area.[95] Similarly, the vast majority of California's agriculture lies in its hot Central Valley, far from the state's rainy region. Conveyance from north to south and from the California-Arizona border via the Colorado River Aqueduct play a critical role in the state's current water management regime.

95 "The California Water System," California Department of Water Resources, 2023, https://water.ca.gov/Water-Basics/The-California-Water-System; California Department of Water Resources, *California Water Resilience Portfolio 2020* (California Natural Resources Agency, California EPA, California Department of Agriculture, July 2020), https://waterresilience.ca.gov/wp-content/uploads/2020/07/Final_California-Water-Resilience-Portfolio-2020_ADA3_v2_ay11-opt.pdf.

96 California Department of Water Resources, *California Water Resilience Portfolio 2020*.

To move surface water for agriculture throughout California's Central Valley, a 20,000 square mile region encompassing the Sacramento and San Joaquin Valleys, the state undertook the Central Valley Project. Proposed in 1920 by the United States Geological Survey (USGS) and approved in 1933 by voters, this massive infrastructure project spans 400 miles from north of Redding down through the Sacramento-San Joaquin Delta (henceforth referred to as the "Bay Delta") and all the way past Bakersfield in Kern County.[97] It consists of 500 miles of canals and aqueducts and delivers up to 9.3 million acre-feet[98] of water to over 250 contractors who use water for irrigation and other purposes.[99] Most of the water it delivers is for agricultural use, but 15 percent supplies urban and industrial uses.

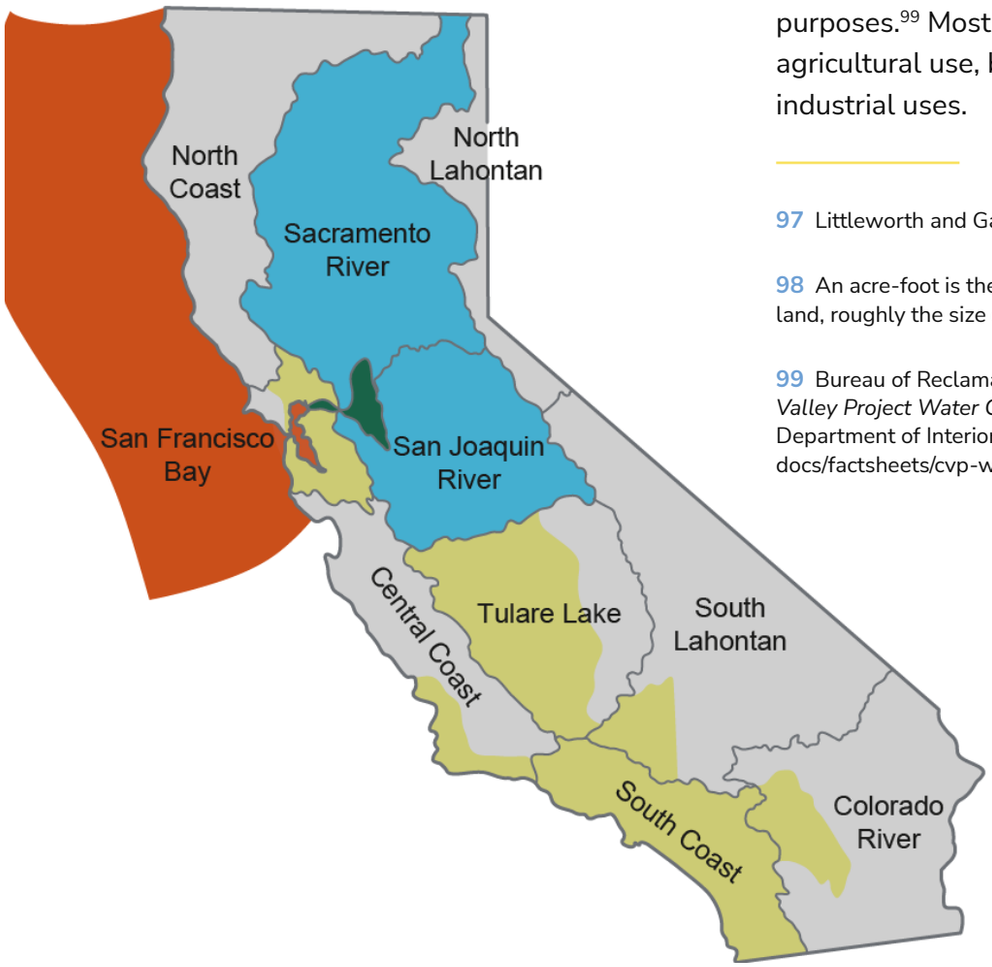


Figure 2. Most California communities receive water from the Bay Delta and its watershed

Figure excerpted with permission from "The Sacramento–San Joaquin Delta" Fact Sheet, by Jeffrey Mount, Ellen Hanak, and Greg Gartrell (2022), Public Policy Institute of California.[100]

97 Littleworth and Garner, California Water II.

98 An acre-foot is the amount of water needed to cover an acre of land, roughly the size of a football field, with water a foot deep

99 Bureau of Reclamation, *California-Great Basin Region Central Valley Project Water Contracts* (Washington, DC: United States Department of Interior, n.d.), https://www.usbr.gov/mp/mpr-news/docs/factsheets/cvp-water-contracts.pdf.

100 *Jeffrey Mount, Ellen Hanak, and Greg Gartrell, "The Sacramento–San Joaquin Delta" Fact Sheet, Public Policy Institute of California, May 2022, https://www.ppic.org/publication/the-sacramento-san-joaquin-delta/.*

Later, in 1956, the California Legislature authorized the Department of Water Resources (DWR).[101] DWR was tasked with creating a master plan for California's water resources, which culminated in a proposal to build the State Water Project (SWP), a canal running from Northern to Southern California.[102] In 1960, voters narrowly approved the project and its financing at a price tag of $1.75 billion, and DWR broke ground on the SWP in 1961. When water began to flow from Lake Oroville in Northern California through canals, pipelines, and reservoirs to Southern California in 1973, the SWP came to service cities, industry, and agriculture throughout the state, including the state's large metropolitan areas and Central Valley farmland.

Although not heavily influenced by infrastructure, groundwater management — or lack thereof — during this period also shaped contemporary water challenges. By the late 1800s, private and public interests began using electric and gas-powered pumps to extract groundwater to feed industrial agriculture and urban distribution without much regulation.[103] Because groundwater was left unregulated until 2014, it has been severely over-extracted. Today, economically vulnerable communities of color often rely on rural domestic wells that increasingly go dry during droughts, forcing them to buy hauled or bottled water.[104] Meanwhile, nearby industrial agricultural wells, whose overpumping caused those domestic wells to go dry, drill to depths that allow them to continue pumping water from deep in the earth. For example, the Tulare Basin, a particularly dry part of California's Central Valley, has lost about 120 million acre-feet of water storage in the past 100 years.

101 Originally, this Department was created as the "Division of Water Resources."

102 "History," California Department of Water Resources, accessed April 30, 2023, https://water.ca.gov/About/History.

103 Casey Walsh, "Beyond Rules and Norms: Heterogeneity, Ubiquity, and Visibility of Groundwaters," *WIREs Water* 9, no. 4 (July 2022): e1597, https://doi.org/10.1002/wat2.1597.

104 Waldman, Rangarajan, and Chediak, "Groundwater Gold Rush."

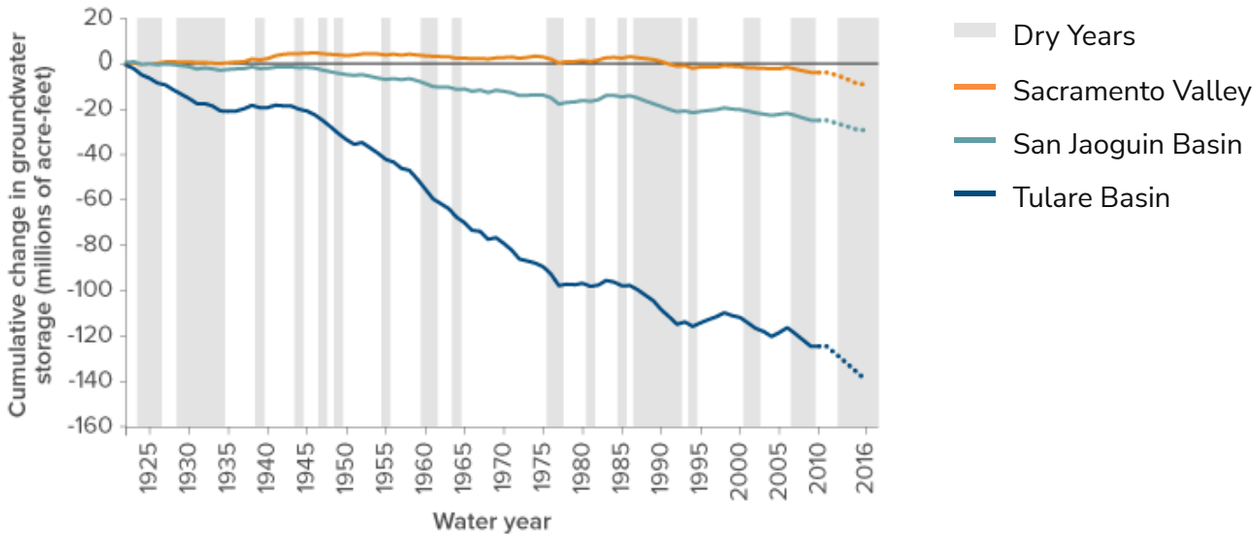


Figure 3. Groundwater pumping is depleting water reserves in the Central Valley

Figure excerpted with permission from "Groundwater in California" Fact Sheet, by Ellen Hanak, Caitrin Chappelle, and Thomas Harter (2017), Public Policy Institute of California.[105]

105 Ellen Hanak, Caitrin Chappelle, and Thomas Harter, "Groundwater in California" Fact Sheet, Public Policy Institute of California, May 2017, https://www.ppic.org/publication/groundwater-in-california/.

Dams cause destruction

Both the Central Valley Project and the State Water Project were spectacular feats of engineering that benefited farming and cities, but were also highly disruptive to ecosystems. California built most of its 1,500 dams[106] during the Development Period to protect some communities from flooding and to store surface water seasonally for hydropower, municipalities, and agricultural purposes — while simultaneously destroying many Indigenous lands and ecosystems. This was part of a larger push to control water through massive infrastructure projects across the American West that shut off thousands of miles of salmon habitat and facilitated increased industrial agriculture — and associated chemical and livestock pollution that made it almost impossible for native species to survive.[107] The altered downstream conditions harmed steelhead and salmon populations, bringing them and other fish populations to near-extinction levels.[108]

These new dams greatly impacted the environment and fish populations. Though salmon conservation had been codified into law, Fish and Wildlife codes, and regulations since the early 1900s, were frequently not enforced due to political dynamics of management and development institutions and powerful private interests.[109] The Fish and Wildlife Commission pushed for fish passage protections in 1920, but it was politically unpopular to slow development on behalf of fish and ecosystem protections.[110]

These harmful impacts to fish and the environment occurred in part because Indigenous interests were erased during the planning of new dams. In 1951, the United States Bureau of Reclamation proposed the "Ah Pah" dam in Northern California, a name which means "the beginning of the stairway" in the language of the Yurok Tribe.[111] Yet the reconnaissance report did not contain the words "Tribe," "Indian," or "Native American," effectively erasing the Tribes from a project that would have flooded 40 miles of river including the Hoopa Valley Reservation, home to the Yurok, Hoopa, and Karuk people.[112] Ironically, the dam was never built due to fears in Los Angeles that its construction might threaten the city's claims to water from the Colorado River.[113] Shasta Dam is another example of disregard for Indigenous displacement and environmental destruction: Though the dam, completed in 1945 as a critical part of the Central Valley Project, is rightfully considered a great engineering accomplishment for flood control, hydropower, and irrigation purposes, it flooded the homeland of the Winnemem Wintu Tribe along the McCloud River (the Winnemem Waywaket).[114]

The Development Period resulted in engineering marvels that supplied water to millions of

106 Felicity Barringer, "Does Drought-Prone California Need Another Reservoir?," *& the West* (blog), May 17, 2022, https://andthewest.stanford.edu/2022/does-drought-prone-california-need-another-reservoir/.

107 Reisner, *Cadillac Desert*.

108 NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

109 UC Agriculture and Natural Resources, "Western Water."

110 UC Agriculture and Natural Resources, "Western Water."

111 Patricia Leigh Brown, "A Vision of Reviving Tribal Ways in a Remote Corner of California," *New York Times*, March 19, 2012, sec. US, https://www.nytimes.com/2012/03/19/us/yurok-indian-traditions-to-be-revived-in-new-village.html.

112 James K. Agee, "Steward's Fork" in *Steward's Fork: A Sustainable Future for the Klamath Mountains* (Oxford Academic, 2007), 246–53, https://doi.org/10.1525/california/9780520251250.003.0017.

113 Sandoval, "Energy Access Is Energy Justice."

114 West Coast Water Justice, "'Following the Water: How Dams and Water Shape Tribal Recognition in California' with Chief Caleen Sisk," January 18, 2022, podcast, https://www.westcoastwaterjustice.org/1816431/9902952.

Californians. Many of these projects came into being because state agencies supported the goals of large, powerful interests.[115] Fish populations and ecosystems were decimated as a result of this winner-take-all approach. By the 1970s, California had lost 85 percent of its salmon habitat due to dam construction, and today, 41 percent of native fish species are either extinct or threatened.[116] Salmon and steelheads continue to have 95 percent of their spawning habitat blocked.[117] At the same time, Indigenous lands became "sacrifice zones" in service of the national priorities of irrigation, flood control, and hydroelectric development.[118]

HISTORICAL RACIAL GEOGRAPHIES OF WATER

Throughout the Development Period, California saw huge population growth — from less than 1.5 million residents in 1900 to over 23 million in 1980.[119] Racism shaped where BIPOC were allowed to live, where they could afford to live, and where they had the resources to live — with profound impacts on their water security and access. Today, BIPOC face up to 30 percent higher drinking water contamination from pollutants like arsenic, nitrate, and hexavalent chromium.[120] Water systems that serve rural and low-income communities also face disproportionate numbers of water quality violations.[121]

Racism and Infrastructure Exclusion

In rural areas, racist exclusion pushed BIPOC communities to polluted areas and kept them from well-resourced municipal water systems. We detail this dynamic through the story of Black workers in California, although similar dynamics affected Latine farm workers, Japanese former internees, and Hmong and Laotian refugees who settled in California's Central Valley for industrial and agricultural opportunities throughout the 1900s.[122]

While collective memory paints a picture of Hispanic labor replacing Asian labor in California during the early 20th century, Black people came into California's Central Valley mostly as workers, but sometimes as landowners, from about the 1880s to the 1960s.[123] They came as part of the great migration to pursue economic and educational opportunity and escape the oppression of the Jim Crow South.[124] California's Black population grew as anti-Chinese sentiment and the Chinese Exclusion Acts of 1882, 1892, and 1902 pushed out Asian laborers. Black workers were valued as skilled

115 David C. Gibbs, "The Sustainable Development Paradox: Urban Political Economy in the United States and Europe - Edited by Rob Krueger and David Gibbs," *Geographical Journal*, 2009, https://www.academia.edu/25577965/The_Sustainable_Development_Paradox_Urban_Political_Economy_in_the_United_States_and_Europe_Edited_by_Rob_Krueger_and_David_Gibbs.

116 UC Agriculture and Natural Resources, "Western Water."

117 NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

118 Manning, *Upstream*.

119 US Census Bureau, "Resident Population and Apportionment of the U.S. House of Representatives," , https://www.census.gov/history/pdf/californiapops.pdf.

120 Pace et al., "Inequities in Drinking Water Quality Among Domestic Well Communities and Community Water Systems, California, 2011–2019."

121 Pace et al., "Inequities in Drinking Water Quality Among Domestic Well Communities and Community Water Systems, California, 2011–2019."

122 Camille Pannu, "Drinking Water and Exclusion: A Case Study from California's Central Valley Comment," *California Law Review* 100, no. 1 (2012): 223–68, https://scholarship.law.columbia.edu/faculty_scholarship/3596/.

123 Eissinger, "Re-Collecting the Past."

124 "The Great Migration (1910-1970)," National Archives, African American Heritage, last updated June 28, 2021, https://www.archives.gov/research/african-americans/migrations/great-migration; Pannu, "Drinking Water and Exclusion."

laborers, especially in California's cotton fields.[125]

Redlining,[126] sundown towns,[127] restrictive covenants, and exclusion based on lack of water pushed Black farm workers into communities that were small, poor, and often forgotten or ignored by mapmakers and state officials.[128]

Such forms of racism often influenced the (lack of) provision of water, particularly in California's Central Valley. For example, Black people moved into the once-thriving community of Fairmead largely after the town's white residents left due to a lack of groundwater. In the town of Teviston, residents carried water from neighboring towns to their homes until the late 1950s or 1960s.[129] Lanare grew as a farm laborer settlement in which people often lived in substandard housing with no running water. When community development funds and other federal monies became available to Lanare in the 1960s and 1970s, residents moved into mobile homes and established a water district to deliver water to these homes. However, even today the town's groundwater has high levels of arsenic contamination, yet its water treatment facility, built in 2007,[130] sits unused because the community could not afford to run it. Lanare is now an overwhelmingly Latine town[131] and the water from its shallower wells is undrinkable.[132] Despite state grants in 2019 to drill two deeper wells,[133] the state added Lanare to its "at risk" drinking water list in 2023.[134] As in Lanare, today a disproportionate number of water systems that fail to provide adequate and reliable drinking water serve non-white customers and those in low-income areas.[135]

125 Eissinger, "Re-Collecting the Past."

126 In the 1930s, in the wake of the Great Depression, the federal government incentivized homeownership through offering loans. In a racist practice known as redlining, areas perceived as high risk were outlined in red, or "redlined" and denied loans, which systematically excluded BIPOC from purchasing homes.

127 towns that excluded Black people through laws, intimidation, and violence

128 Linda E Méndez-Barrientos et al., "Race, Citizenship, and Belonging in the Pursuit of Water and Climate Justice in California," *Environment and Planning E: Nature and Space* 6, no. 3 (November 2022): 1614–35, https://doi.org/10.1177/25148486221133282; Jennifer Hernandez, "California's History of Water Discrimination," *New Geography* (blog), October 19, 2022, https://www.newgeography.com/content/007605-californias-history-water-discrimination; David Bacon, "Rooted In Exclusion, Towns Fight For The Right To Water," *Random Lengths News* (blog), November 17, 2021, https://www.randomlengthsnews.com/archives/2021/11/17/water-exclusion/36786.

129 Eissinger, "Re-Collecting the Past."

130 Ezra David Romero and Kerry Klein, "They Built It, But Couldn't Afford To Run It — Clean Drinking Water Fight Focuses On Gaps In Funding," *KVPR*, June 6, 2017, https://www.kvpr.org/health/2017-06-06/they-built-it-but-couldnt-afford-to-run-it-clean-drinking-water-fight-focuses-on-gaps-in-funding.

131 "Lanare, CA," Data USA, accessed October 21, 2023, https://datausa.io/profile/geo/lanare-ca/.

132 Waldman, Rangarajan, and Chediak, "Groundwater Gold Rush."

133 Kerry Klein, "After More Than A Decade, Lanare's Water Is Finally Safe To Drink," *KVPR*, July 2, 2019, https://www.kvpr.org/health/2019-07-02/after-more-than-a-decade-lanares-water-is-finally-safe-to-drink.

134 "SAFER Dashboard" California Water Boards, State Water Resources Control Board, last updated May 1, 2023, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/saferdashboard.html.

135 Abhold et al., 2023 Drinking Water Needs Assessment.

WATER INFRASTRUCTURE EXCLUSION: A TALE OF TWO TOWNS

The story of two neighboring towns in California's Central Valley that began in the early 1900s — the all-white town of Alpaugh and the Black town of Allensworth — exemplifies the exclusion and grifting BIPOC communities faced from water infrastructure investments, racism, and capitalism.

In 1908, Colonel Allen Allensworth and four other Black people came together to promote and build a Black community in Southern Tulare County. They named the community Allensworth and developed it with the goal of becoming a model community to "demonstrate the ability of African Americans to achieve at the same level of success as their white neighbors, given equal opportunity."[136] Around the same time, the neighboring, all-white community of Alpaugh was developed. Proximity was about all the two communities had in common. Alpaugh had highly fertile soil, while Allensworth's soil was highly alkaline. Land developers charged Alpaugh residents $30 per acre of land, while charging Allensworth residents $110 per acre.[137]

The management of Pacific Farming, a land sales and management company for both towns, drilled 10 wells and installed a city water system in Alpaugh, but only drilled 3 of the 10 promised wells in Allensworth, reneging on their promise of developing a water system.[138]

Having earned a large return on their Allensworth investment, Pacific Farming withdrew from the venture and transferred worthless water company stock to Allensworth's residents. A nearby public utility used a recession as an excuse not to extend electricity service,[139] and the Santa Fe Railroad installed a rail spur to bypass Allensworth so white farmers could avoid the town's Black residents.[140] A lack of water, electricity, and rail service, combined with the better known challenges of poor water and soil quality, set the town on a path of decline.

The dynamics of Allensworth encapsulate how racism (which led to the compounding differences in land prices, soil and water quality, and infrastructure investment between the two towns) and capitalism (Pacific Farming's exit from Allensworth after profiting from land sales) intersected to enrich white people at the expense of Black people. A descendent of one of Allensworth's founders was quoted as saying, "The venture was a skin game, plain and simple — White men cheating Black men."[141]

136 Eissinger, "Re-Collecting the Past."

137 Eissinger, "Re-Collecting the Past."

138 Eissinger, "Re-Collecting the Past."

139 Eissinger, "Re-Collecting the Past."

140 Cal Ag Roots Podcast, "We Are Not Strangers Here Ep 5: Back to the Land: Allensworth and the Black Utopian Dream," podcast, March 9, 2021, https://podcasts.apple.com/us/podcast/we-are-not-strangers-here-ep-5-back-to-the-land/id1080823272?i=1000512278793.

141 Eleanor Mason Ramsey, *Allensworth — A Study in Social Change* (Berkeley, CA: University of California, Berkeley, 1977); Eissinger, "Re-Collecting the Past."

Contemporary challenges due to past exclusionary policies

Redlining in the past has influenced where people live and their access to political power and public resources in the present. Many BIPOC live in unincorporated areas, where they cannot vote on officials in adjacent communities who decide whether or not to extend water services to their community.[142] State officials then have no clear point of contact when trying to provide water infrastructure to unincorporated communities. Through these mechanisms — and supposedly race-blind language about a lack of technological capacity and high costs — nearby communities do not extend infrastructure that can provide safe and reliable water access for those without it.[143]

Today, disadvantaged unincorporated communities (those with residents having an income of less than 80 percent of the state median and located outside incorporated boundaries) are the most likely to receive water from unsafe sources.[144] Toxic levels of nitrates leached from soil and agricultural runoff are more often found in majority-Latine communities,[145] and BIPOC in California are more likely to receive contaminated water than white communities.[146]

Also as a result of redlining, oil and gas wells are disproportionately located in areas where marginalized communities live, exposing residents to air and water pollution, noise, and other sources of stress.[147] In California, the top 10 percent of the neighborhoods impacted by pollution are 91 percent BIPOC.[148]

Another legacy of this systemic racism is that people who struggle to afford water are more likely to be BIPOC. About one in eight Californians have water debt[149] — but higher percentages of BIPOC have debt, and their debt is higher on average.[150] A SWRCB Survey found that among households that owe over $1,000 for water, a higher percentage are Hispanic and Black households.[151] Among the most utility debt–burdened households, 18 percent are Black and 64 percent are Latine, while only 12 percent are white.[152] The economic marginalization of BIPOC contributes to this phenomenon through slavery, segregation, and Jim Crow laws, which led to BIPOC working in undervalued and underpaid

142 Méndez-Barrientos et al., "Race, Citizenship, and Belonging in the Pursuit of Water and Climate Justice in California."

143 Méndez-Barrientos et al., "Race, Citizenship, and Belonging in the Pursuit of Water and Climate Justice in California."

144 Jonathan K. London et al., "Disadvantaged Unincorporated Communities and the Struggle for Water Justice in California" *Water Alternatives*14, no. 2 (2021), https://www.water-alternatives.org/index.php/alldoc/articles/vol14/v14issue2/626-a14-2-4/file.

145 Anne Weir Schechinger, "In California, Latinos More Likely To Be Drinking Nitrate-Polluted Water," Environmental Working Group, October 7, 2020, http://www.ewg.org/interactive-maps/2020-california-latinos-more-likely-drinking-nitrate-polluted-water/.

146 Pace et al., "Inequities in Drinking Water Quality Among Domestic Well Communities and Community Water Systems, California, 2011–2019."

147 David J. X. Gonzalez et al., "Historic Redlining and the Siting of Oil and Gas Wells in the United States," *Journal of Exposure Science & Environmental Epidemiology* 33, no. 1 (January 2023): 76–83, https://doi.org/10.1038/s41370-022-00434-9.

148 Office of Environmental Health Hazard Assessment, "Analysis of Race/Ethnicity and CalEnviroScreen 4.0 Scores," October 2021, https://oehha.ca.gov/media/downloads/calenviroscreen/document/calenviroscreen40raceanalysisf2021.pdf.

149 California Water Boards, "Covid-19 Drinking Water Survey," Board Meeting, powerpoint presentation, January 19, 2021, https://www.waterboards.ca.gov/drinking_water/programs/documents/ddwem/covid_financial_survey_board_ppt_20210119.pdf.

150 Botts, "The Pandemic Has Accelerated a Water Debt Crisis for Households Unable to Pay Their Bills. Families Fear Water Shutoffs Are Coming."

151 Botts, "The Pandemic Has Accelerated a Water Debt Crisis for Households Unable to Pay Their Bills. Families Fear Water Shutoffs Are Coming."

152 Gonzalez et al., "Keeping the Lights and Water On: COVID-19 and Utility Debt in Los Angeles' Communities of Color."

positions.[153] For this reason, achieving water justice is intrinsically connected to improving the well-being of BIPOC communities through targeted interventions that expand their economic opportunities.[154]

While BIPOC in California struggled with racism and lack of infrastructure provision, California's white settlers mobilized for water infrastructure, rights, and agricultural profits resulting in economic advancement and secure water access. By the 1970s, California's overwhelmingly white population had built and prospered from networks of water infrastructure that helped them manage highly variable precipitation.[155] As the state's population doubled again, mostly through growth in Latine, Asian, and other minority populations, predominantly white activists blocked most new infrastructure, including projects that would have benefited California's newer residents.[156]

Teviston, a small Black community located between cotton and produce fields in the San Joaquin Valley, exemplifies the dynamic of white benefit and BIPOC exclusion from infrastructure provision. Teviston's residents were excluded from receiving water from the adjacent irrigation district even though nearby fields received plenty. To add insult to injury, Teviston farmers had to pay for water that leaked onto their fields. The ways in which Black communities dealt with systemic exclusion from water resources and racism more broadly but still managed to build homes, churches, and businesses shows their resilience.[157]

153 Danyelle Soloman, Connor Maxwell, and Abril Castro, "Systematic Inequality and Economic Opportunity," *Center for American Progress* (blog), August 7, 2019, https://www.americanprogress.org/article/systematic-inequality-economic-opportunity/.

154 Soloman, Maxwell, and Castro, "Systematic Inequality and Economic Opportunity."

155 Hernandez, "California's History of Water Discrimination."

156 Hernandez, "California's History of Water Discrimination."

Period of Environmental Regulation (1970 to Present)

Water for ecosystems is a critical component of a just and resilient water future. Today, solutions must meet ecosystem needs and be increasingly resilient to climate extremes like stronger storms and longer droughts. However, as exemplified during the Development Period, California's water management infrastructure was not built with climate change or natural systems in mind. Tracing the history of California water policy through the 1960s and into the 1970s shows how the current environmental protection landscape was formed.

During this period, legal and policy instruments began to yield some successes in protecting California's environment, surface water, and water quality. These successes provided an important foundation for water policy today, but still face many limitations because they are protections that rely on lawsuits. These instruments must often provide evidence that very specific environmental stakes are dire (e.g., that there is a risk of species extinction), and rely on well-resourced and active public interest litigation.

LEGISLATION AND ITS LIMITS

The social upheavals and growth of the United States environmental movement of the 1960s and 1970s led to a series of laws at the federal and state levels that created new protections for ecosystems and species.

The National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) were passed in 1970. Both pieces of legislation required governments and agencies to analyze

157 Eissinger, "Re-Collecting the Past."

environmental impacts before implementing projects. The same year, the California Endangered Species Act (CESA) further expanded protections for species and the environment. The federal Clean Water Act of 1972 gave the federal government power to set wastewater and surface water quality standards. It also made it illegal for industry to discharge pollutants into navigable waters without a permit.[158]

In 1974, Congress also passed the Safe Drinking Water Act, which set limits for chemical and microbial contaminants in drinking water. Although the EPA has used the authority in this act to regulate more than 90 contaminants, many remain unregulated. The law also did not regulate private wells serving 25 people or fewer.[159] This omission contributed and has continued to contribute to greater water contamination experienced by BIPOC in California who use private wells.[160] In California, this contamination often comes from runoff from industrial, agricultural, and manufacturing activities.

Ultimately, a key weakness of environmental protection legislation is its reliance on sustained collective action. The focused campaigns of private interests often outflank and outspend more diffuse campaigns to protect public resources. [161] To this day, environmental advocacy remains a costly, adversarial process. Nonetheless, key developments — like accounting for the environment in planning processes and water quality regulations — serve as an important base for creating better future policies.

CEQA creates fruitful opportunities for litigation to protect waterways, but often only if issues are raised during a 30-day public comment period. This short timeframe puts significant onus on organizations and citizens to participate vigilantly during prescribed windows of time in formal forums.[162] CESA is also a legal stopgap that can challenge and stop harmful development projects in court.[163] However, these slow and adversarial legal processes often cannot keep up with damage to fish populations.

WINS FOR WATERWAYS IN COURT

In the 1970s, court decisions led to important changes to how California and federal law treated waterways. Throughout the decade, litigants sought to protect peoples' access to public resources by arguing that California failed to live up to its "Public Trust" in stewarding its (previously stolen) land. Rulings affirmed that the public had the right to access, use, and enjoy waterways and even some scenic lands, a legal precedent that quickly became an important tool for environmental protection litigation.[164]

For example, in 1971, *Marks v. Whitney* established that the court could not infringe on the public's right to tidelands. Similarly, the famous 1973 Mono Lake case, *National Audubon Society v. Superior Court*, arose when Mono Lake was on the precipice of ecological collapse due to excessive water diversions. Environmental activists successfully argued that the

158 "Summary of the Clean Water Act," Laws & Regulations, US Environmental Protection Agency, updated June 22, 2023, https://www.epa.gov/laws-regulations/summary-clean-water-act.

159 "Safe Drinking Water Act (SDWA)," US Environmental Protection Agency, updated March 30, 2023, https://www.epa.gov/sdwa.

160 Pace et al., "Inequities in Drinking Water Quality Among Domestic Well Communities and Community Water Systems, California, 2011–2019."

161 UC Agriculture and Natural Resources, "Western Water."

162 Conor O'Brien, "I Wish They All Could Be California Environmental Quality Acts: Rethinking NEPA in Light of Climate Change," *Boston College Environmental Affairs Law Review* 36, no. 1 (2009): 239–72, https://core.ac.uk/download/pdf/71459592.pdf.

163 West Coast Water Justice, "California's Inequitable Water Rights System and Water Projects," podcast, March 8, 2022, https://www.westcoastwaterjustice.org/1816431/10184305.

164 "Public Engagement," California State Lands Commission, accessed February 11, 2023, https://www.slc.ca.gov/public-engagement/.

lake belonged to the Public Trust.[165] This legal win expanded the definition of the Public Trust to include recreational use, aesthetic values, and importance to wildlife — thus successfully increasing water and ecosystem protections.

By 1989, the courts and the SWRCB codified the Public Trust Doctrine into written law. As a result, five court cases and three water board decisions referenced this code. This ultimately allowed private individuals to "force the state . . . to do a better job of protecting environmental interests."[166] In 1986, a ruling by the State Court of Appeals (referred to as the Racanelli Decision) directed the State Board to consider all beneficial uses, including instream needs like navigation, recreation, and ecology, of the Bay Delta water when setting water quality standards.[167]

Given the history of violence to people and the environment involved in the design and functioning of California's water system, recommending policies for equitable and resilient water security requires a major reconsideration of how water and ecosystems will be managed for current Californians and future generations. This is particularly pressing as the climate crisis threatens predictable patterns of seasonal precipitation, which California's infrastructure was designed for (described in more detail below).

165 Littleworth and Garner, *California Water II*.

166 UC Agriculture and Natural Resources, "Western Water."

167 "Summary of *United States v State Water Resources Control Board*," Letter to John Kirlin from Virginia A. Cahill and Edmund G. Brown Jr., State of California Department of Justice, November 16, 2007, https://cawaterlibrary.net/wp-content/uploads/2017/09/Racanelli-Decision.pdf.

2.
The Current State and Challenges to California Water Management

The climate crisis will exacerbate California's water management challenges

Climate change will fundamentally alter water availability in California. The state has already begun experiencing "weather whiplash" (oscillating extremes of wet and dry weather). In early 2023, a heavy storm season (capped off by the state's first tropical storm) led to 31 atmospheric river[168] events,[169] resulting in extreme floods, over 20 fatalities, extensive physical damage, and historic levee failures.[170] This weather came on the heels of a three-year drought, at the end of which much of the state reached record dryness.

Climate change is expected to double the frequency of both wet and dry weather extremes, and will also make them more severe.[171] Figure 4 shows the responsiveness that water systems will need to manage climate variability in the future.

168 An atmospheric river is a long, thin region of the atmosphere that carries a large volume of water, often from the tropics.

169 Grace Toohey, "Volcano? Climate Change? Bad Luck? Why California Was Hit with 31 Atmospheric River Storms," *Los Angeles Times*, April 11, 2023, https://www.latimes.com/california/story/2023-04-11/californias-wild-winter-of-atmospheric-rivers.

170 Hayley Smith, "California Risk Shifts from Drought to Floods after Record Rain, Snow," *Los Angeles Times*, March 17, 2023, https://www.latimes.com/environment/story/2023-03-17/as-drought-retreats-across-california-flood-risk-rises; Madeline Halpert and Brandon Drenon, "California Battles Heavy Floods, High Winds and Rain," *BBC News*, March 22, 2023, sec. US & Canada, https://www.bbc.com/news/world-us-canada-64959807; California Department of Water Resources, "DWR Supports Flood Fight Efforts at Pajaro River Levee Break," March 17, 2023, https://water.ca.gov/News/Blog/2023/Mar-23/DWR-Supports-Flood-Fight-Efforts-at-Pajaro-River-Levee-Break.

171 Berg and Hall, "Increased Interannual Precipitation Extremes over California under Climate Change."

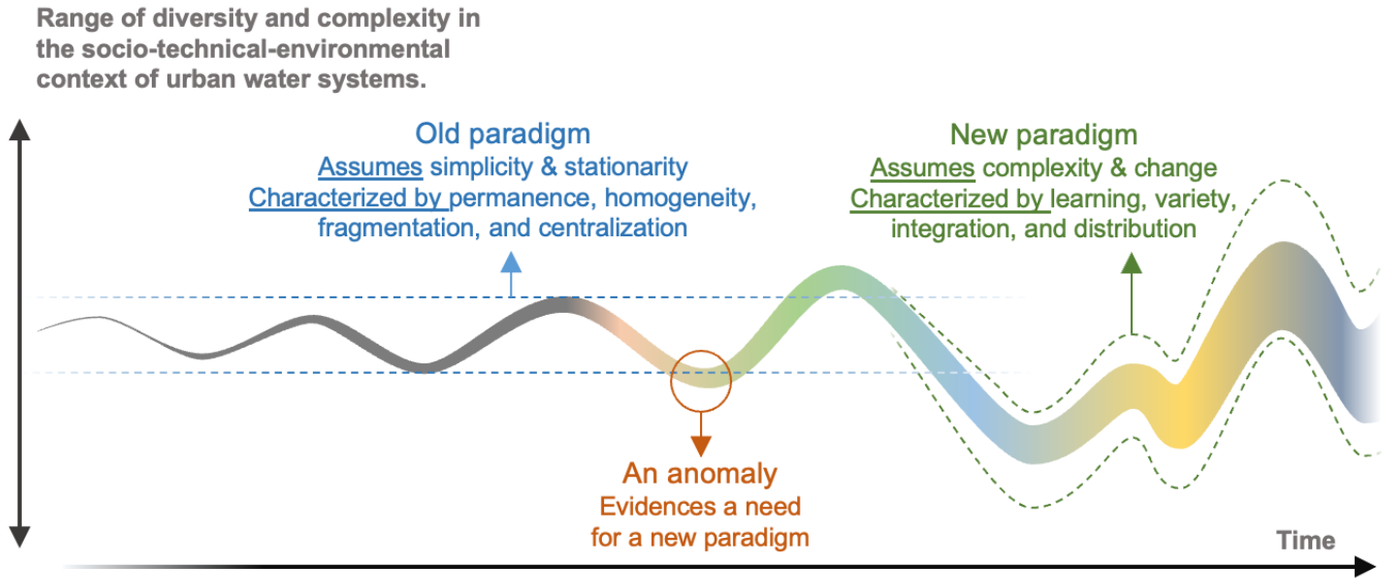


Figure 4. A new paradigm for managing water systems given climate variability

Source: Franco-Torres et al. (2021).[172] Image used with permission.

172 Manuel Franco-Torres, Briony C. Rogers, and Robin Harder, "Articulating the New Urban Water Paradigm," *Critical Reviews in Environmental Science and Technology* 51, no. 23 (December 2, 2021): 2777–2823, https://doi.org/10.1080/10643389.2020.1803686.

Currently, California meets higher spring and summer water demands through winter precipitation stored as snow and in reservoirs. However, by 2100, California's snowpack is projected to decrease by two-thirds, primarily due to a shift from precipitation falling as snow to falling as rain.[173] If snow melts into reservoirs earlier, more water will need to be released into the ocean during the winter when water demands are lower. Releasing this water earlier in the year results in water shortages during the dry summer months.[174] If temperatures warm, causing melting or so-called "rain-on-snow" events that wash snow away too early, surface water storage for summer will decrease further.[175]

High precipitation events, while often leading to dangerous flooding, also provide opportunities for groundwater recharge. As of July 2023, California estimated it recharged 3.8 million acre-feet of water during the 2023 water year (from October 2022 to September 2023).[176]

Hotter temperatures due to climate change also cause more intense, more frequent, and longer droughts during the dry season. During such droughts, groundwater pumping accelerates, especially in California's Central Valley, as farms use more groundwater as a buffer resource to irrigate crops when less surface water is available. As climate change lengthens droughts, periods of increased groundwater pumping are likely to lengthen as well. This pumping leads to increased groundwater contamination, saltwater intrusion into coastal aquifers, and land subsidence — when the overlying land sinks due to the removal of groundwater, causing permanent reductions in underground storage capacity.[177] These adverse effects have immediate consequences for human health and water pumping costs, and cause long-term increases in precarity for groundwater users.

Seawater intrusion due to rising sea levels, compounded in some places by depleted groundwater aquifers, also threatens California's water supplies. Rising seas threaten coastal infrastructure like wastewater facilities, which are often located at low elevation, and make coastal groundwater too salty to drink. Critically, sea level rise poses a systemic risk to California's Bay Delta system. Forty percent of the state's water resources flow from Northern California to Southern California through the Delta (and adjoining conveyance systems like the Central Valley Project and State Water Project).[178] Because the ocean is directly adjacent to the Delta, sea level rise will increase saltwater in the Delta, threatening water supply to millions of people and millions of acres of farmland. The Bay Delta is also subsiding, hastening the onset of this problem. Like most climate concerns, these challenges are worsening; by the end of the century, the sea level is projected to have risen nearly five feet.[179]

173 California Office of Planning and Research and Natural Resources Agency, *California's Fourth Climate Change Assessment: Statewide Summary Report* August 2018, https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf.

174 Elissa Lynn (editor), *California Climate Science and Data for Water Resources Management* (Sacramento, CA: California Department of Water Resources, June 2015), https://cawaterlibrary.net/document/california-climate-science-and-data-for-water-resources-management/.

175 Ellen Hanak et al., *California's Future: Water and a Changing Climate* (San Francisco: Public Policy Institute of California, January 2021), https://www.ppic.org/publication/californias-future-water-and-a-changing-climate/.

176 "DWR Captures and Stores Water from Record-Breaking Snowpack," California Department of Water Resources, updated July 19, 2023, https://water.ca.gov/News/Blog/2023/July-23/DWR-Captures-and-Stores-Water-from-Record-Breaking-Snowpack

177 "Update 2018," California Department of Water Resources, accessed December 24, 2023,https://water.ca.gov/programs/california-water-plan/update-2018.

178 Mount, Hanak, and Gartrell, "The Sacramento–San Joaquin Delta."

179 California Office of Planning and Research and Natural Resources Agency, *California's Fourth Climate Change Assessment: Statewide Summary Report*.

In the midst of all of the complexity and variability climate change creates for water management, California's SWRCB lacks the real-time monitoring and verification systems to effectively regulate diversions of surface water. Existing law only requires surface water users to report diversions annually for the prior year,[180] creating real, dire risks that over-diversions among largely unregulated senior rights claimants can reduce availability for all other users and threaten minimum flows required to protect fish and wildlife. Similarly, groundwater use is hard to accurately track due to different measurement approaches,[181] and experts disagree about which tools to use and about whether volumes are over or underestimated.[182]

California's water history indicates that marginalized communities, which already face contaminated and unreliable water supply, will face the brunt of the impacts of the climate crisis. Below, we discuss how the history of water management, emerging climate threats, and contemporary policies shape the current state of water use for California's industry (including agriculture), domestic users, and the environment.

Current State of Domestic Water Use

Californians spend an average of $77 per month on water — the second most among people in any state.[183] But about a million Californians do not have access to safe drinking water in their homes — and more than two-thirds of failed systems (those unable to provide adequate and reliable drinking water) are in low-income, under-resourced communities of color.[184] Data from CalEnviroScreen (a tool that evaluates a community's economic and environmental conditions) shows that the neighborhoods in the top 10 percent for least pollution are 67 percent white while the neighborhoods in the top 10 percent for most polluted are 89 percent BIPOC.[185] To address these challenges, California passed a law in 2012 recognizing the Human Right to Water, and passed a funding mechanism for the law, the Safe and Affordable Funding for Equity and Resilience (SAFER) Fund, in 2019.

CODIFYING THE HUMAN RIGHT TO WATER

California codified the Human Right to Water (HR2W) through Assembly Bill 685 in 2012 after a decade of organizing by many groups, including the Environmental Justice Coalition for Water and the Safe Water Alliance.[186] The bill was mostly aspirational — it had no teeth or funding mechanisms — but still influences state agencies and policymakers when they revise or establish policies and regulations that affect water delivery and use.[187] The HR2W law created a foundation for water equity for under-resourced communities and signaled an increasing orientation toward treating water as a

180 Lee et al., *Updating California Water Laws to Address Drought and Climate Change*.

181 Allegra Roth, "Sustainable Groundwater Management and Cover Crops, a Study of San Joaquin Valley Groundwater Sustainability Agencies," Advanced Policy Analysis (Goldman School of Public Policy, UC Berkeley, May 15, 2023).

182 In person interview with Allegra Roth, Master of Public Policy, Goldman School of Public Policy, April 14, 2023.

183 "Water Prices by State 2023," Wisevoter, accessed December 24, 2023, https://wisevoter.com/state-rankings/water-prices-by-state/.

184 Emily Hoeven, "1 Million Californians Lack Safe Drinking Water," *CalMatters*, July 27, 2022, http://calmatters.org/newsletters/whatmatters/2022/07/california-drinking-water-safe/.

185 Lee et al., *Updating California Water Laws to Address Drought and Climate Change*.

186 Jenny Rempel and Kristin Dobbin, "Symbolic, Tactical, and Transformative: Understanding the Impact of California's Human Right to Water Law Ten Years After Passage" Presentation at Conference on Policy Process Research (Denver, Colorado, 2023).

187 Rempel and Dobbin, "Symbolic, Tactical, and Transformative."

human right, even if it did little — if anything — to fundamentally change water management practices in the short term.

ESTABLISHING SAFE AND AFFORDABLE FUNDING FOR EQUITY AND RESILIENCE (SAFER)

California created the Safe and Affordable Funding for Equity and Resilience (SAFER) Fund as part of SB 200 in 2019. The law aimed to accomplish the objectives of the HR2W for under-resourced communities by funding "sustainable solutions for small systems with drinking water violations."[188] SAFER receives 5 percent of the proceeds from California's Greenhouse Gas Reduction Fund, up to $130 million annually, and has funding secured through 2030.[189]

SAFER funding specifically targets small, under-resourced communities, defined as those providing drinking water service to less than 10,000 people and wastewater service to less than 20,000 people, and communities with a median household income of less than 80 percent of the statewide median household income.[190] Communities must apply for SAFER funding, which has few strings and requirements attached, especially relative to funds available through the federally supported State Revolving Funds (SRFs) for clean water and drinking water. The SRF funding is also being partially siphoned off through federal earmarks, diminishing its ability to become a revolving fund for infrastructure in low-income communities.[191] SAFER funds can be used to provide technical assistance, interim water supplies, and implementation of drinking water or wastewater capital improvement projects. So far, SAFER has distributed $700 million in grants for 185 projects to provide safe and affordable water that has benefited 1.2 million Californians.[192] However, there is still more to do: California identified 381 failing systems in its 2023 drinking water report.[193] The criteria for a failing system are narrower than the specifications for achieving a Human Right to Water,[194] meaning the number of identified failing systems is an underestimate.

188 State Water Resources Control Board, "SAFER Drinking Water."

189 "Bill Text - SB-200 Drinking Water," California Legislative Information, accessed April 6, 2023, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB200.

190 "Small Community Funding Program - Application Process," Office of Sustainable Water Solutions, State Water Resources Control Board updated February 17, 2022, https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/scfp.html.

191 Tony Romm, "States Lose Federal Water Funds as Lawmakers Redirect Money to Pet Projects," *Washington Post*, July 24, 2023, sec. Business, https://www.washingtonpost.com/business/2023/07/24/water-infrastructure-congress-earmarks/.

192 Abhold et al., *2023 Drinking Water Needs Assessment.*

193 Abhold et al., *2023 Drinking Water Needs Assessment.*

194 State Water Resources Control Board, "Human Right to Water."

Figure 5. There are many water systems that fail to protect the Human Right to Water

Source: Abhold et al. (2023); "SAFER Dashboard" (2024).[195]

Smaller water systems often struggle to deliver clean, safe drinking water, but they are also often adjacent to larger, better funded systems. In these situations, consolidations can bring smaller systems more technical, managerial, and financial resources to better serve their customers. SB 88, passed in 2015, enables the state to obligate these larger water systems — the decision-makers for which are often reluctant because of associated costs — to consolidate with smaller systems.[196] From 2017 to August 2023, California's water systems completed 224 consolidations.[197]

UTILITY WATER CHALLENGES

Water for utility ratepayers is often expensive, especially for low-income communities.[198] One in eight Californians owes their water utility money[199] and climate change threatens aging water infrastructure in ways that likely harm marginalized communities disproportionately.

Water rates have increased rapidly in recent decades, making affordability a central barrier to achieving the HR2W. Mirroring national trends of increasingly unaffordable water,[200] California's low-income households experienced a 45 percent increase in their average water rate between 2007 and 2015, while their incomes stagnated over the same period.[201] Rate increases occurred due to increasing supply costs, expanding treatment standards, higher

195 Abhold et al., *2023 Drinking Water Needs Assessment.*; "SAFER Dashboard" State Water Resources Control Board, Updated January 8, 2024, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/saferdashboard.html.

196 "Mandatory Consolidation or Extension of Service for Disadvantaged Communities," State Water Resources Control Board, California Water Boards, updated September 8, 2023, https://www.waterboards.ca.gov/drinking_water/programs/compliance/.

197 "SAFER Engagement Unit Data," Consolidation Data Dashboard, State Water Resources Control Board, California Water Boards, updated August 22, 2023, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/dashboard.html.

198 Abhold et al., *2023 Drinking Water Needs Assessment.*

199 California Water Boards, "Covid-19 Drinking Water Survey," Board Meeting, powerpoint presentation, January 19, 2021, https://www.waterboards.ca.gov/drinking_water/programs/documents/ddwem/covid_financial_survey_board_ppt_20210119.pdf.

200 Coty Montag, *Water/Color: A Study of Race & the Water Affordability Crisis in America's Cities* (New York: The Thurgood Marshall Institute at the NAACP Legal Defense and Educational Fund, Inc., May 2019), https://www.naacpldf.org/wp-content/uploads/Water_Report_FULL_5_31_19_FINAL_OPT.pdf.

201 Gregory Pierce et al., *Recommendations for Implementing of a Statewide Low-Income Water Rate Assistance Program* (California State Water Resources Control Board and UCLA Luskin Center for Innovation, February 2020), https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/docs/ab401_report.pdf.

expectations of operators, climate change adaptation, and aging and failing infrastructure. Federal spending on water infrastructure has also declined since the 1970s, increasing pressure on ratepayers.[202] In addition, the dominant affordability discourse in the US since the 1970s has focused on utility financial capacity rather than household financial burdens, making water affordability difficult to measure or manage for most governments.[203]

The burden of these increasing costs falls disproportionately on low-income households, which spend a larger proportion of their income on water services.[204] California's 2023 Drinking Water Needs Assessment found that 60 percent of water systems face affordability burdens, and higher proportions of low-income communities face medium or high affordability burdens.[205] Seventy percent of water systems designated by the state as failing serve majority non-white populations.

To combat affordability challenges, especially for lower-income households, some water utilities have turned to "budget-based" or "tiered" water rates. In this rate structure, utilities charge a very low rate for a small allocation of water needed to meet basic human needs, and increasing rates for additional water for outdoor irrigation and excessive use. A tiered rate increases at regular intervals for all customers, while a budget-based rate increases at different intervals based on household and property size. Although imperfect, such rate designs, coupled with affordability programs for the lowest-income consumers, can lessen affordability challenges. However, California's Prop 218 requires that utilities charge customers based on the cost of providing a service, which makes progressive rate designs difficult to implement. Water utilities must justify their differential tiers based on costs of supplying water from different sources rather than equity or conservation goals.

Beyond facing unaffordable water costs, BIPOC and those who live in lower-income neighborhoods disproportionately experience utility debt[206] (and are therefore also likely to experience utility shutoffs). After a shutoff, customers often must pay their original water bill, late fees, interest, and disconnection and/or reconnection fees before utilities restore service. And once service is restored, customers face an elevated risk of contamination due to stagnant water during the shutoff.

Organizers in Los Angeles, such as the Los Angeles Alliance for a New Economy, are fighting back, and recently won a policy change that would protect low-income citizens, seniors, and other eligible customers enrolled in the local utility's EZ-SAVE program from water shutoffs. The new policy also prohibits shutoffs for all customers during extreme weather events like heat waves.[207]

202 American Water Works Association, "State of the Water Industry Report 2018" (Denver, CO: American Water Works Association, 2018), https://www.awwa.org/Portals/0/AWWA/Development/Managers/2018_SOTWI_Report_Final_v3.pdf.

203 Jessica J. Goddard, Isha Ray, and Carolina Balazs, "How Should Water Affordability Be Measured in the United States? A Critical Review," *WIREs Water* 9, no. 1 (January 2022): e1573, https://doi.org/10.1002/wat2.1573.

204 Jessica J. Goddard, Isha Ray, and Carolina Balazs, "Water Affordability and Human Right to Water Implications in California," *PLoS ONE* 16, no. 1 (January 20, 2021): e0245237, https://doi.org/10.1371/journal.pone.0245237.

205 Kristyn Abhold et al., "*2023 Drinking Water Needs Assessment*.

206 Smith, "Los Angeles DWP to End Water and Power Shutoffs for Low-Income Customers Who Can't Pay"; Gonzalez et al., "Keeping the Lights and Water On: COVID-19 and Utility Debt in Los Angeles' Communities of Color."

207 "LADWP Board of Commissioners Approves Motion Suspending Water and Power Shutoffs for Non-Payment During L.A. Extreme Heatwaves and Cold Weather" LADWP News, Los Angeles Department of Water & Power, updated June 27, 2023, https://www.ladwpnews.com/ladwp-board-of-commissioners-approves-motion-suspending-water-and-power-shutoffs-for-non-payment-during-l-a-extreme-heatwaves-and-cold-weather/.

WELL WATER CHALLENGES

Currently, many families, especially those in agricultural regions like the Central Valley, encounter dry wells due to overpumping of historically unregulated groundwater by industrial agricultural producers.[208] Water that is available is often polluted because industrial agriculture flushes pesticides, fertilizers, and other contaminants like arsenic into household drinking water.

These families are predominantly Latine, low-income, and often work on the very farms whose owners benefit most from groundwater extraction and degradation.[209] While families bring in bottled water or seek state support to deepen their wells when those wells have gone dry, agricultural interests drill new wells to protect investments in specialty crops like almonds,[210] often grown for export. Beyond the injustice of losing water for basic needs, California law considers all homes without running water uninhabitable. By law, these houses cannot be sold[211] or borrowed against,[212] which means that a low-income family without the means to purchase another home becomes trapped in a home without running water and often cannot get a loan for a new well either. These households often struggle further because they live in unincorporated areas with fewer public resources. In many instances, they simply had no choice but to live outside city limits due to racist land use practices, including redlining and overt discrimination.

THE SUSTAINABLE GROUNDWATER MANAGEMENT ACT

To address challenges with unsustainable — and unjust — groundwater depletion, California became the last Western state to regulate groundwater use[213] in 2014 through the Sustainable Groundwater Management Act (SGMA). Under SGMA, groundwater basins deemed high or medium priority must establish Groundwater Sustainability Agencies (GSAs), which are governance bodies tasked with creating and executing plans to achieve sustainable groundwater management by 2040 to 2042. SGMA defines sustainable groundwater management as the management and use of groundwater that does not cause any of six undesirable results:

- Chronic lowering of groundwater levels indicating a depletion of supply;
- Reduction of groundwater storage;
- Seawater intrusion;
- Degraded water quality or water contamination;
- Land subsidence; or
- Depletion of interconnected surface water.

To achieve sustainability, each GSA was required to submit a Groundwater Sustainability Plan (GSP) to the California Department of Water Resources for review by 2022. As of February 2, 2024, 73 plans have been approved, 13 have been deemed incomplete, 23 have been deemed inadequate, and

208 Zoom interview with Nataly Escobedo Garcia, Leadership Counsel for Justice and Accountability on February 28, 2023.

209 Zoom interview with Nataly Escobedo Garcia, Leadership Counsel for Justice and Accountability on February 28, 2023.

210 Emily Reisman and Luke Macaulay, "Which Farms Drill during Drought? The Influence of Farm Size and Crop Type," *International Journal of Water Resources Development* 38, no. 2 (March 2022): 262–82, https://doi.org/10.1080/07900627.2021.1874889.

211 Zoom interview with Nataly Escobedo Garcia, Leadership Counsel for Justice and Accountability on February 28, 2023.

212 Zoom interview with Kyle Jones, Community Water Center on July 21, 2023.

213 Gary Pitzer, "Explainer: The Sustainable Groundwater Management Act: The Law, The Judge And The Enforcer," Water Education Foundation, June 22, 2020, https://www.watereducation.org/western-water/explainer-sustainable-groundwater-management-act-law-judge-and-enforcer.

10 have not yet been reviewed.[214] If DWR deems a plan inadequate, the SWRCB can step in to manage the basin.[215] These state agencies therefore have meaningful power over groundwater basin planning processes with which they can push for equity and sustainability, if they choose to use it.

While SGMA was passed to prevent adverse outcomes, in practice the law faces many limitations. First, SGMA's 2040 implementation timeline does little for people already experiencing dry wells due to overpumping, such as for the almost 1,500 Californians whose wells went dry during the summer of 2022. Second, GSAs are often composed of members who represent agricultural interests,[216] while over 80 percent of low-income communities did not have formal representation on GSAs.[217] These disparities contribute to the continuation of the power structure through which a relatively small group of predominantly white men disproportionately control the state's water resources.[218] Despite significant efforts from some to participate in the SGMA decision-making processes, community advocates often find themselves with limited access to, or influence in, these processes.[219] In these ways and others, SGMA does not do enough to protect domestic well users or those reliant on small water systems, who are often the most vulnerable. Third, SGMA's GSA boundaries rarely match those of groundwater basins, meaning few basins have a basin-wide governance body for sustainable groundwater management.

Finally, SGMA does not cover adjudicated basins (basins that had their distribution settled through legal means). In the process of adjudication, those without legal representation (which can be expensive and inaccessible for some), face greater risk of receiving little or no water allocation.[220]

214 "GSP Status Summary," SGMA Groundwater Management (SGMA) Portal, Department of Water Resources, accessed March 19, 2023, https://sgma.water.ca.gov/portal/gsp/status?utm_medium=email&utm_source=govdelivery.

215 Sustainable Groundwater Management Office, "Sustainable Groundwater Management Act Groundwater Sustainability Plan Evaluation Fact Sheet," California Department of Water Resources, January 2022, https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Files/SGMA-fact-sheet.pdf.

216 Zoom interview with Nataly Escobedo Garcia, Leadership Counsel for Justice and Accountability on February 28, 2023.

217 Kristin B. Dobbin and Mark Lubell, "Collaborative Governance and Environmental Justice: Disadvantaged Community Representation in California Sustainable Groundwater Management," *Policy Studies Journal* 49, no. 2 (May 2021): 562–90, https://doi.org/10.1111/psj.12375.

218 Restore the Delta, "ANALYSIS: California Water Rights Still 90% White," press release, February 27, 2023, https://www.restorethedelta.org/2023/02/27/analysis-california-water-rights-still-90-white/.

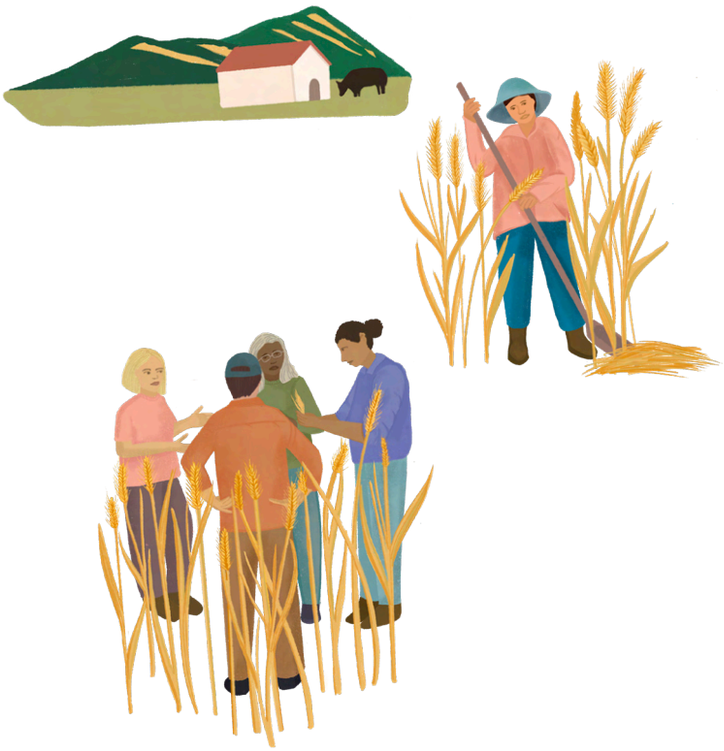
219 Kristin B. Dobbin, "'Good Luck Fixing the Problem': Small Low-Income Community Participation in Collaborative Groundwater Governance and Implications for Drinking Water Source Protection," *Society & Natural Resources* 33, no. 12 (December 2020): 1468–85, https://doi.org/10.1080/08941920.2020.1772925.

220 Interview with a statewide farmer advocacy organization on April 24, 2023.

Current State of Industrial Water Use

AGRICULTURE

Irrigated agriculture plays an outsized role in California's water use, making up 40 percent of the state's use.[221] In 2021, almost 69,000 farms operated in California, representing 24.2 million acres of production and $51.1 billion in cash receipts.[222] These receipts accounted for 11.8 percent of all US farm receipts, the highest percentage of any state in the nation, and 2.5 percent of the state's economy.[223]



In addition to meeting people's need for food, agriculture supports global supply chains and provides employment that supports rural livelihoods.[224]

Agriculture is concentrated in California's Central Valley, which contains many communities defined as "disadvantaged" by CalEnviroScreen.[225] These communities are often Latine and unincorporated, and are underrepresented, understudied, and underserved in academic and journalistic writing.[226]

Animal agriculture is highly polluting

Agricultural growing methods and crop types can have significant adverse impacts on water, soil, chemical contamination, and carbon cycles — and by extension, on ecosystem quality. Such impacts are far worse for animal agriculture compared to crops grown for direct human consumption because

221 Jeffrey Mount, Ellen Hanak, and Caitlin Peterson, "Water Use in California," Public Policy Institute of California, April 2023, https://www.ppic.org/wp-content/uploads/jtf-water-use.pdf.

222 California Department of Food and Agriculture, *California Agricultural Statistics Review 2021-2022* (Sacramento, CA: CDFA, 2022), https://www.cdfa.ca.gov/Statistics/PDFs/2022_Ag_Stats_Review.pdf.

223 "California | The Economic Contributions and Impacts of U.S. Food, Fiber, and Forest Industries," Division of Agriculture Research & Extension, University of Arkansas System, accessed February 11, 2023, https://economic-impact-of-ag.uada.edu/california/.

224 Navin Ramankutty et al., "Trends in Global Agricultural Land Use: Implications for Environmental Health and Food Security," *Annual Review of Plant Biology* 69, no. 1 (2018): 789–815, https://doi.org/10.1146/annurev-arplant-042817-040256; Patrick Webb et al., "The Urgency of Food System Transformation Is Now Irrefutable," *Nature Food* 1, no. 10 (October 2020): 584–85, https://doi.org/10.1038/s43016-020-00161-0; A. C. Wartenberg, D. Moanga, and V. Butsic, "Identifying Drivers of Change and Predicting Future Land-Use Impacts in Established Farmlands," *Journal of Land Use Science* 17, no. 1 (January 2022): 161–80, https://doi.org/10.1080/1747423X.2021.2018061.

225 "CalEnviroScreen 4.0," California Office of Environmental Health Hazard Assessment, May 1, 2023, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40; Angel Santiago Fernandez-Bou et al., "Water, Environment, and Socioeconomic Justice in California: A Multi-Benefit Cropland Repurposing Framework," *Science of The Total Environment* 858, part 3 (February 2023): 159963, https://doi.org/10.1016/j.scitotenv.2022.159963.

226 Leigh A. Bernacchi et al., "A Glass Half Empty: Limited Voices, Limited Groundwater Security for California," *Science of The Total Environment* 738 (October 2020): 139529, https://doi.org/10.1016/j.scitotenv.2020.139529; Angel Santiago Fernandez-Bou et al., "Underrepresented, Understudied, Underserved: Gaps and Opportunities for Advancing Justice in Disadvantaged Communities," *Environmental Science & Policy* 122 (August 2021): 92–100, https://doi.org/10.1016/j.envsci.2021.04.014; Fernandez-Bou et al., "Water, Environment, and Socioeconomic Justice in California."

of the inefficiency of using crops for feed.[227] Using a database of water use estimates based on 570 life cycle assessments from 38,000 farms in 119 countries, scientists found that vegan and vegetarian diets require 46 to 60 percent of the water use and have only 26 to 42 percent of the eutrophication impact of high-meat diets.[228]Animal agriculture also drives worse outcomes for greenhouse gas emissions, land use, and biodiversity.[229] While California has meaningful hog, poultry, and cattle production, its biggest contribution to animal agriculture is through dairy. California produced 18.1 percent of the nation's milk in 2021 — more than any other state.[230]

Despite industrial agricultural interests providing funding to grow the conversation around "regenerative ranching" (rotating cattle on lands in ways that prevent overgrazing and sequester carbon in the soil), [231] most animals raised for consumption in the US live in concentrated animal feeding operations (CAFOs). CAFOs house thousands of animals — and therefore their manure — on relatively small land areas. CAFOs pollute drinking water and the air, breed antibiotic resistance, and lead to fish kills.[232] A study in North Carolina linked proximity to hog CAFOs with increased mortality, including infant mortality.[233] In California, people of color, Hispanic people, and Indigenous Peoples are 29 percent, 54 percent, and 15 percent, respectively, more likely to live within three miles of a CAFO than non-Hispanic white people.[234] The same study found that low-income Californians are also more likely to live near CAFOs. In California, CAFOs disclose little about their operations, though the organizations Earthjustice and Food and Water Watch are petitioning and suing the Environmental Protection Agency (EPA) to require greater oversight and regulation of these highly polluting and dangerous operations.[235]

Groundwater overdraft threatens community water supplies and the environment

Beyond the issues of pollution and contamination, especially as produced by conventional animal agriculture, agricultural crop production often relies on groundwater overdraft because of the dry climate and low volume of surface water. For example, much of the San Joaquin River's available surface water is

227 Peter Scarborough et al., "Vegans, Vegetarians, Fish-Eaters and Meat-Eaters in the UK Show Discrepant Environmental Impacts," *Nature Food* 4, no. 7 (July 2023): 565–74, https://doi.org/10.1038/s43016-023-00795-w.

228 Scarborough et al., "Vegans, Vegetarians, Fish-Eaters and Meat-Eaters in the UK Show Discrepant Environmental Impacts."

229 Scarborough et al., "Vegans, Vegetarians, Fish-Eaters and Meat-Eaters in the UK Show Discrepant Environmental Impacts."

230 California Department of Food and Agriculture, "California Agricultural Statistics Review 2021-2022."

231 Spencer Roberts, "How Big Ag Bankrolled Regenerative Ranching," *Jacobin*, March 5, 2022, https://jacobin.com/2022/03/big-agriculture-funding-regenerative-ranching-amp-grazing-soil-carbon.

232 D. Lee Miller and Gregory Muren, *CAFOs: What We Don't Know Is Hurting Us* (New York: National Resources Defense Council, September 2019), https://www.nrdc.org/sites/default/files/cafos-dont-know-hurting-us-report.pdf.

233 Julia Kravchenko et al., "Mortality and Health Outcomes in North Carolina Communities Located in Close Proximity to Hog Concentrated Animal Feeding Operations," *North Carolina Medical Journal* 79, no. 5 (September 2018): 278–88, https://doi.org/10.18043/ncm.79.5.278.

234 Arbor J.L. Quist, Jill E. Johnston, and Mike Dolan Fliss, *Disparities of Industrial Animal Operations in California, Iowa, and North Carolina* (San Francisco: Earthjustice, October 2022), https://earthjustice.org/wp-content/uploads/quistreport_cafopetition_oct2022.pdf.

235 Emily Miller, "We're Suing EPA (Again) For Being Too Soft on Factory Farm Polluters," Food & Water Watch, June 7, 2021, https://www.foodandwaterwatch.org/2021/06/07/were-suing-epa-again-for-being-too-soft-on-factory-farm-polluters/; Earthjustice, "Over Fifty Groups Petition EPA to Improve Oversight of Water Pollution from Concentrated Animal Feeding Operations," press release, October 26, 2022, https://earthjustice.org/press/2022/over-fifty-groups-petition-epa-to-improve-oversight-of-water-pollution-from-concentrated-animal-feeding.

diverted for agriculture, resulting in about 60 miles of the river running dry most years.[236]

Figure 6. Sixty miles of the San Joaquin river run dry most years

Source: Photo courtesy of Josh Uecker (2009).

Overpumping of groundwater can have drastic consequences: Storage may be permanently reduced due to land subsidence. Overpumping groundwater also causes higher concentrations of contaminants in drinking water,[237] higher pumping costs, decreased well yields, and dry wells.[238] Water depletion and land conversion from habitat to farmland also harm native species.[239] Droughts, regulation, endangered species protection, and increased water demand from Southern California intensify pressure on agricultural

236 NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

237 Ellen Hanak et al., *Water and the Future of the San Joaquin Valley* (San Francisco, CA: Public Policy Institute of California, February 2019), https://www.ppic.org/publication/water-and-the-future-of-the-san-joaquin-valley/.

238 Josué Medellín-Azuara et al., *Economic Analysis of the 2016 California Drought on Agriculture* (Davis, CA: UC Davis Department of Watershed Sciences, August 2016), https://watershed.ucdavis.edu/sites/g/files/dgvnsk8531/files/products/2021-05/DroughtReport_20160812-3.pdf.

239 Hanak et al., *Water and the Future of the San Joaquin Valley*.

water supplies.[240]

The financialization of water benefits the rich

Amidst the increasing pressure on water supply, banks, pension funds, and insurers are increasingly buying land and water rights to make huge profits off water scarcity.[241] Since 2010, these institutions, often without local connections, have quadrupled the land they manage to 120,000 acres.[242] In addition, the Wonderful Company (which is local) owns 180,000 acres of land and harvests an annual pistachio and almond crop worth close to $1.4 billion.[243] To pick that crop, the company employs less than 50 workers, each making only $11 per hour (per reporting in 2018).[244] Stewart Resnick, owner of the Wonderful Company, has bragged about using his monopoly power to keep prices high. To ensure a steady supply of water, his company built an off-the-books water pipeline and installed a former employee as manager of the local water district.[245] Similarly, in 2012 Harvard's endowment purchased a vineyard in the Cuyama Valley, which locals could only understand as an attempt to broker water.[246] Harvard's local employee got elected to the local water district, and its shell company, Brodiaea, filed to drill seven wells deeper than any others in the county the day before a drilling moratorium went into effect in 2013.

These financial interests have participated in, if not driven, a shift in the Central Valley away from crops like alfalfa, rice, and cereals and toward nut and fruit trees.[247] Favored for their profitability,[248] almonds gained the most acreage of any crop from 2007 to 2016 in California's Central Valley (an increase of about 500,000 acres), even as land fallowing increased overall.[249] However, tree crops like almonds also decrease water use flexibility since trees require water throughout their lifetime,[250] which creates strong incentives to pump groundwater during droughts.[251] Indeed, one study found that perennial crop growers are the most likely to drill new wells during dry years.[252] And since 2019, one in every six of the deepest wells has been drilled on land owned or managed by outside investors.[253] To secure water access for unsustainable farming,

240 Hanak et al., *Water and the Future of the San Joaquin Valley.*

241 Waldman, Rangarajan, and Chediak, "Groundwater Gold Rush."

242 Waldman, Rangarajan, and Chediak, "Groundwater Gold Rush."

243 Arax, "A Kingdom from Dust."

244 Arax, "A Kingdom from Dust."

245 Arax, "A Kingdom from Dust."

246 Gold, "Harvard Quietly Amasses California Vineyards — and the Water Underneath."

247 Mekonnen Gebremichael et al., "What Drives Crop Land Use Change during Multi-Year Droughts in California's Central Valley? Prices or Concern for Water?" *Remote Sensing* 13, no. 4 (January 2021): 650, https://doi.org/10.3390/rs13040650; Wartenberg, Moanga, and Butsic, "Identifying Drivers of Change and Predicting Future Land-Use Impacts in Established Farmlands."

248 Gebremichael et al., "What Drives Crop Land Use Change during Multi-Year Droughts in California's Central Valley?"; Wartenberg, Moanga, and Butsic, "Identifying Drivers of Change and Predicting Future Land-Use Impacts in Established Farmlands"; Brian D. Richter et al., "Alleviating Water Scarcity by Optimizing Crop Mixtures," *Nature Water* 1, (November 2023): 1035–1047, https://www.nature.com/articles/s44221-023-00155-9.

249 Gebremichael et al., "What Drives Crop Land Use Change during Multi-Year Droughts in California's Central Valley?"

250 Gebremichael et al., "What Drives Crop Land Use Change during Multi-Year Droughts in California's Central Valley?"; Jesus Arellano-Gonzalez and Frances C. Moore, "Intertemporal Arbitrage of Water and Long-Term Agricultural Investments: Drought, Groundwater Banking, and Perennial Cropping Decisions in California," *American Journal of Agricultural Economics* 102, no. 5 (2020): 1368–82, https://doi.org/10.1111/ajae.12123.

251 Bradley Franklin, Kurt Schwabe, and Lucia Levers, "Perennial Crop Dynamics May Affect Long-Run Groundwater Levels," *Land* 10, no. 9 (September 2021): 971, https://doi.org/10.3390/land10090971; Reisman and Macaulay, "Which Farms Drill during Drought?"

252 Reisman and Macaulay, "Which Farms Drill during Drought?"

253 Waldman, Rangarajan, and Chediak, "Groundwater Gold Rush."

the Wonderful Company's owners even captured the Kern Water Bank, in which they now own a 57 percent stake.[254] In doing so, they warped a public-private partnership that was intended to create a water reservoir to support greater water resilience to instead accelerate the shift in agricultural production toward fruit and nut trees,[255] benefiting themselves rather than the public.

The financialization of water harms the poor

While investors profit from unsustainable water use in agriculture, local families suffer the consequences of not having running water in their homes. At least one local family had to pay $2 per gallon of water, move to a more expensive home, and pay $500/month to power their deeper well after their old one went dry.[256] This was the impact of just 1 of 1,500 wells that went dry statewide in 2022.[257] Many other families likely faced similar or worse consequences, and these will only increase in number and severity as the climate crisis worsens and investment funds increase their profiteering on water.

California has attempted to reduce groundwater overpumping through the Sustainable Groundwater Management Act (SGMA). However, one study estimated that SGMA would lead to 500,000 to 750,000 acres of cropland fallowing in the Central Valley[258] while another study estimated 500,000 to 1 million acres of fallowing.[259] These estimates represent about 10 to 20 percent of the Central Valley's irrigated farmland. Researchers estimate that fallowing would reduce crop revenue by $7.2 billion annually while directly cutting 42,000 jobs and $1.1 billion in wages, and cutting 85,000 jobs and $2.1 billion in wages when factoring in jobs in related sectors like transportation and food processing.[260]

The top 25 percent most disadvantaged communities (per CalEnviroScreen) are likely to face the brunt of these losses as they are more than twice[261] as likely to be employed in agriculture than other Californians.[262] Meanwhile, when outside investors are confronted about SGMA, some openly share their plans to mine groundwater, make big profits, and flee before the regulations kick in.[263] This approach would leave local communities both without water and, absent new economic development, without long-term economic prospects.

254 Arax, "A Kingdom from Dust"; Chloe Sorvino, "Amid Drought, Billionaires Control A Critical California Water Bank," *Forbes*, September 20, 2021, https://www.forbes.com/sites/chloesorvino/2021/09/20/amid-drought-billionaires-control-a-critical-california-water-bank/.

255 Gebremichael et al., "What Drives Crop Land Use Change during Multi-Year Droughts in California's Central Valley?"

256 Waldman, Rangarajan, and Chediak, "Groundwater Gold Rush."

257 "Dry Well Reporting System Data," California Natural Resources Agency Open Data, California Natural Resources Agency, accessed December 25, 2023, https://data.cnra.ca.gov/dataset/dry-well-reporting-system-data.

258 Hanak et al., *Water and the Future of the San Joaquin Valley*.

259 David Sunding and David Roland-Holst, *Blueprint Economic Impact Analysis: Phase One Results* (Berkeley, CA: UC Berkeley, February 2020), https://www.restorethedelta.org/wp-content/uploads/SJV-Blueprint-for-Extinction-Economic-Study-2-15-2020.pdf.

260 Sunding and Roland-Holst, *Blueprint Economic Impact Analysis: Phase One Results.*

261 4.3 percent of people in the top 25 percent of most disadvantaged communities work in agriculture, versus 1.8 percent for Californians at large. In the Central Valley, these percentages are 15 and 7 percent.

262 Sunding and Roland-Holst, *Blueprint Economic Impact Analysis: Phase One Results*.

263 Waldman, Rangarajan, and Chediak, "Groundwater Gold Rush."

OTHER INDUSTRY

In the same way that overpumping groundwater in agriculture pollutes and depletes water, certain industrial water uses pollute water and increase prices for urban water consumers.

For many years, industries in southeast Los Angeles mined, used, and polluted the water. As a result, water from the San Fernando Valley groundwater aquifer requires advanced treatment technologies to drink.[264] This helps keep Los Angeles reliant on taking water from — and adversely affecting — other places in the arid American West like the Owens Valley and the Colorado River, despite more locally concentrated pollution. To address this challenge, Los Angeles plans to build a $600 million plant to clean water in the now-superfund-designated San Fernando Valley groundwater basin.[265] Because corporations have largely skirted financial responsibility for cleaning up the contaminated groundwater, most of the up-front project funding is coming from the state and nearby municipalities. Ultimately, ratepayers will shoulder the ongoing costs of drinking water processed through more expensive and energy-intensive advanced treatment methods.[266]

Finally, the extraction and refining processes of fossil fuels require water use, and burning them worsens climate threats to California's water supply. A Food and Water Watch report found that in three years, the oil and gas industry in California used more than 3 billion gallons (or over 9,000 acre-feet) of water just for oil extraction.[267] This does not include water used for oil refining, which uses about 1.5 gallons of water for each gallon of oil,[268] or water made undrinkable through contamination. Phasing out fossil fuels is necessary to prevent worsening droughts and floods, and would make more water available to meet the state's needs.

Current State of Environmental Systems and Lifeways

Ecosystems on which humans and other animals have depended for millennia for survival, recreation, and cultural practices have increasingly been degraded. Climate change worsens these impacts. For example, the loss of mountainous snowpack trickling downhill to provide a continuous stream of water in the dry summer months threatens ecosystems. With early melting, water bodies may dry up for months at a time. Fish and plants, unable to leave the increasingly arid environment, will die. Migratory waterfowl, beavers, and humans will seek out other water sources, which will then dwindle even faster due to increased use.

In addition, ecosystems such as estuaries and wetlands are particularly vulnerable to changes in the balance of freshwater (reduced by declining snowpack) and saltwater (increased by sea level rise).[269] Prioritizing water for industrial agriculture and cities has led to dredging, filling, and water diversions in wetlands and estuaries. More than 90 percent of California's wetlands have been lost, with

264 Smith, "Drought-Ravaged L.A. Seeks Surprising Source of Water."

265 Smith, "Drought-Ravaged L.A. Seeks Surprising Source of Water."

266 Smith, "Drought-Ravaged L.A. Seeks Surprising Source of Water."

267 Food & Water Watch, *Big Ag, Big Oil, and the California Water Crisis* (Washington, DC: Food & Water Watch, February 2023), https://www.foodandwaterwatch.org/wp-content/uploads/2023/01/CalWaterCrisis.pdf.

268 Jacobs Consultancy, *Potential Vulnerability of US Petroleum Refineries to Increasing Water Temperature and/or Reduced Water Availability*, (Prepared for US Department of Energy, January 2016), https://www.energy.gov/sites/prod/files/2016/03/f30/US%20DOE%20Refinery%20Water%20Study.pdf.

269 Hanak et al., *California's Future*.

coastal wetlands experiencing disproportionately higher rates of loss.[270] Estuaries, transitional zones between the ocean and coastal freshwater, provide critical habitat for many species and open space for recreation like canoeing and birdwatching. They also act as a natural two-way filter, providing freshwater with protection from salinization from the ocean, and the ocean with protection from pollutants flowing from freshwater.[271] Estuaries often contain thick nets of marsh plants and seagrass that buffer the coast against storm surge, sea level rise, and flooding. Such protections are one type of "green infrastructure," a natural alternative to concrete-based "gray infrastructure" solutions like seawalls and levees.

The map below shows how increased agricultural production in the Bay Delta came at the cost of natural flood protection and habitat provided by the region's wetlands.

270 "How Much Wetland Area Has California Lost?" My Water Quality: Are Our Wetlands Healthy? Wetland Monitoring Workgroup of the California Water Quality Monitoring Council, accessed April 12, 2023, https://mywaterquality.ca.gov/eco_health/wetlands/extent/loss.html.

271 Nicholas Da Silva, "Estuary Management at California State Parks," California Sea Grant, n.d., https://caseagrant.ucsd.edu/news/estuary-management-at-california-state-parks.

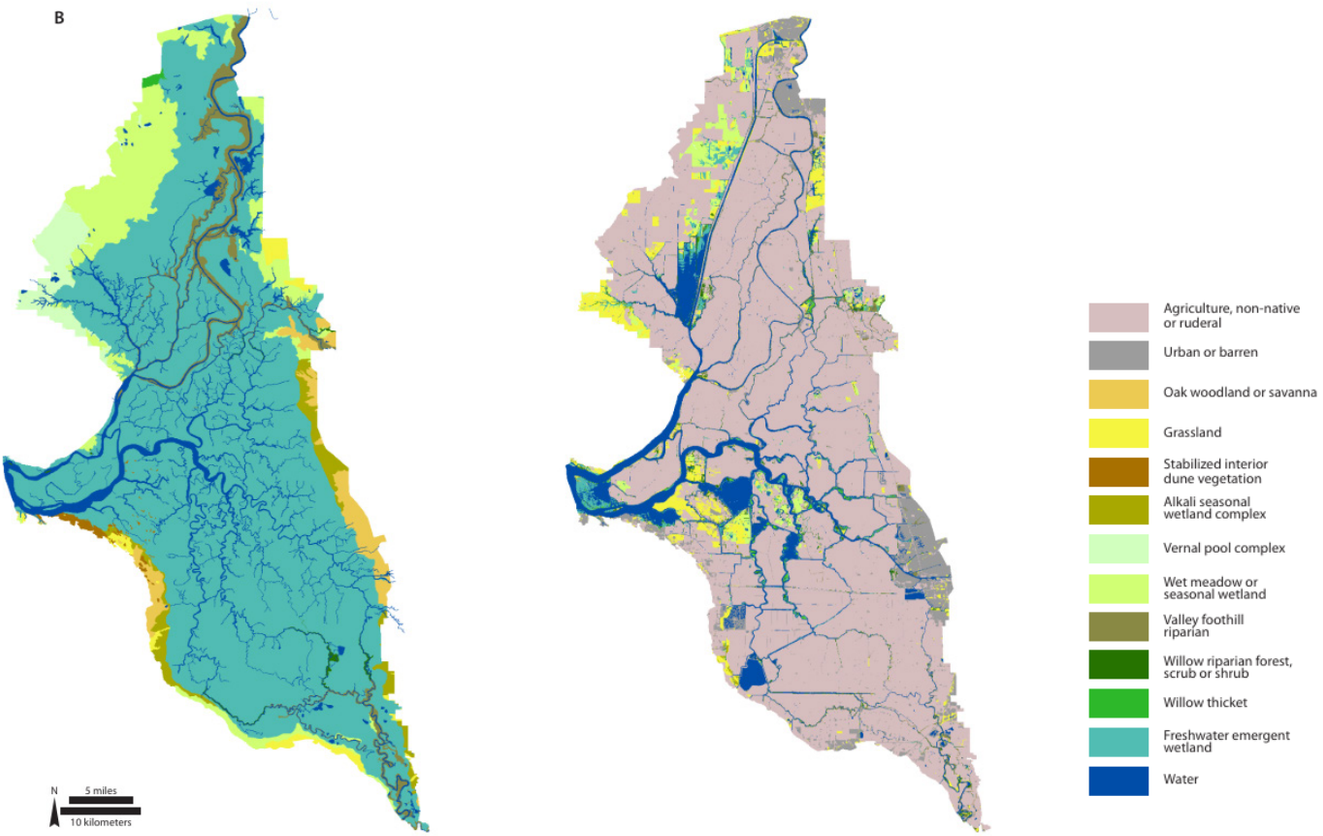


Figure 7. Sacramento-San Joaquin Delta (Bay Delta) wetlands loss

Source: Whipple et al., (2012), San Francisco Estuary Institute-Aquatic Science Center.[272] Image used with permission.

272 Whipple AA, Grossinger RM, Rankin D, Stanford B, Askevold RA, "Sacramento-San Joaquin Delta Historical Ecology Investigation: Exploring Pattern and Process," A Report of SFEI-ASC's Historical Ecology Program, Publication #672, Richmond, CA:San Francisco Estuary Institute-Aquatic Science Center, 2012. https://www.sfei.org/sites/default/files/biblio_files/Delta_HistoricalEcologyStudy_SFEI_ASC_2012_highres.pdf.

During stretches of drought, allocation of water for environmental use has historically been reduced before use for any other sector.[273] Drought and "demand hardening," a phenomenon in which reduced water consumption over time reduces flexibility for further reductions during droughts, compound these issues. Eventually, water demand during drought cannot be reduced much at all, putting increasing pressure on environmental flows.

TRIBES STRUGGLE CONTINUOUSLY FOR WATER, LAND, AND LIBERATION

"Indigenous struggles over water figure centrally in concerns about self-determination, sovereignty, nationhood, autonomy, resistance, survival, and futurity. Together, they offer us a language to challenge and resist the violence enacted through and against water . . . a way to envision and build alternative futures where water is protected and liberated from enclosures imposed by settler colonialism, capitalism, and heteropatriarchy."

(Melanie Yazzie and Cutcha Risling Baldy)[274]

"Water is everything. Without water, there is no life . . . I have witnessed firsthand the long years of struggle that our people have undertaken to survive without adequate access to clean water needs."

(Bo Mazzetti, chair of the Rincon Band of Luiseño Indians, president of the San Luis Rey Indian Water Authority)[275]

As early as 1905, the US Supreme Court acknowledged that water and fish "were not much less necessary to the existence of the Indians than the atmosphere they breathed."[276] Some Tribes (including the Klamath, Karuk, Hupa, Winnemem Wintu, and Yurok Tribes of what is today Northern California and Oregon) are referred to as the Salmon People because of how deeply they relate to fish in their cultural and religious traditions and ways of life. While most Tribes rely on fish as a source of subsistence within a traditional, healthy diet, all Tribes' subsistence and cultural integrity is bound up in relationships with land and water.

Mega-infrastructure development of water systems, industrial agriculture, and a settler government have threatened Indigenous Peoples' access and rights to their land and have harmed the ecosystems that are central to their health and existence. For example, the Yurok Reservation was established as a permanent homeland for Yurok people in 1855, when the federal government recognized their fishing, hunting, and water rights, entitling the Tribe to the water and

273 Jeffrey Mount and Ellen Hanak, "Water Use in California," PPIC Water Policy Center, May 2019, https://cwc.ca.gov/-/media/CWC-Website/Files/Documents/2019/06_June/June2019_Item_12_Attach_2_PPICFactSheets.pdf.

274 Melanie Yazzie and Cutcha Risling Baldy, "Introduction: Indigenous Peoples and the Politics of Water," *Decolonization: Indigeneity, Education & Society* 7, no. 1 (August 31, 2018): 1–18, https://jps.library.utoronto.ca/index.php/des/article/view/30378.

275 Bo Mazzetti, "Opinion: California Tribes Need Better Access to Clean Water," San Diego Union-Tribune, August 29, 2022, https://www.sandiegouniontribune.com/opinion/commentary/story/2022-08-29/opinion-california-tribes-need-better-access-to-clean-water.

276 United States Bureau of Reclamation, *Interim Report on Reconnaissance* (Salt Lake City, UT: The Investigation, 1951), https://catalog.hathitrust.org/Record/101680907; Sandoval, "Energy Access Is Energy Justice."

fish needed to support their way of life. However, damaged land, waterways, and fish populations; contaminated drinking water; and threatened food systems all harm the Yurok people's health and well-being.[277]

Tribal lands often experience poor water quality and threats to ecosystem health. For example, in 2020, thousands of birds died of botulism from low water levels in Tule Lake and Lower Klamath National Wildlife Refuge in Northern California; meanwhile toxic blue-green algae that requires no-contact warnings proliferates in nearby reservoirs, harming people, animals, and crop production.[278]

Today, there are 109 federally recognized Indigenous Tribes in California, and 80 others currently petitioning for recognition.[279] Unrecognized Tribes and those without land face compounding harms. For example, lack of federal recognition contributed to the Winnemem Wintu Tribe being displaced from their homelands, which encompass the Winnemem Waywaket (McCloud River), much of which is now flooded by the Shasta reservoir. Reduced quantity and quality of water in water basins harms Tribes' food sovereignty, and directly damages health through exposure to toxicity, as well as nutritional, cultural, and spiritual harm.[280]

Tribes in arid regions of central and Southern California are not faring well either, having been similarly relegated to reservations, rancherias, cities, and rural towns with increasing threats to water security, in addition to suffering the harms of displacement and environmental degradation.

Tribes have advocated tirelessly, and often successfully, for environmental protections to sustain their ways of life. California formally recognized the importance of these contributions in 2014 when it passed AB 52 to require Tribal consultation for state and local projects through CEQA, although implementation and enforcement improvements are needed.[281] The SWRCB took another step forward in 2017 when it expanded the definition of "beneficial uses" (for appropriative water rights) to include subsistence use generally, Tribe subsistence use specifically, and Tribe cultural use.[282] This is an important protection that, in addition to serving Tribes, can be further leveraged to enable the functioning of natural ecosystems to support fishing and protect ceremonial relationships with waterways under threat from over extraction and pollution. Four dams on the Klamath River are scheduled for removal — another victory that the state of California owes to Indigenous-led resistance.[283] Thus, while Tribes face significant harms, they have shown they are strong organizers who have won improvements for themselves and ecosystems.

277 Atmos, "Course Correction."

278 Atmos, "Course Correction."

279 Save California Salmon, "Advocacy & Water Protection in Native California Curriculum."

280 West Coast Water Justice , "Following the Water: How Dams and Water Shape Tribal Recognition in California," podcast, January 18, 2022, https://www.westcoastwaterjustice.org/1816431/9902952.

281 Save California Salmon, "Advocacy & Water Protection in Native California Curriculum."

282 "Tribal Beneficial Uses – Cultural Uses of Water," Tribal Affairs, California State Water Resources Control Board, updated June 9, 2023, https://www.waterboards.ca.gov/tribal_affairs/beneficial_uses.html.

283 Save California Salmon, "Advocacy & Water Protection in Native California Curriculum."

REMOVAL OF THE KLAMATH DAM WAS A WIN FOR TRIBES

PacifiCorp, a large power utility, began removing four dams along the Klamath River, shown on the map in Figure 8, in 2023 with completion scheduled for 2024.[284] This victory for ecosystems and people took decades of organizing from Tribes and environmental interest groups, even though removing these dams is also the most economically sound decision — the costs to update the dams to pass environmental codes would exceed their potential hydropower profits.[285]

284 Christian Thorsberg, "The Largest Dam Removal Project in U.S. History Begins Final Stretch, Welcoming Salmon Home," *Smithsonian Magazine*, January 22, 2024, https://www.smithsonianmag.com/smart-news/the-largest-dam-removal-project-in-us-history-begins-final-stretch-welcoming-salmon-home-180983621/.

285 California Fish Passage Forum, Klamath River Renewal Corporation & their Partners, "Preparing the Klamath Basin for Dam Removal"; West Coast Water Justice, "Save California Salmon," September 25, 2021, podcast, https://podcasts.apple.com/us/podcast/save-california-salmon/id1587526639?i=1000536613127.

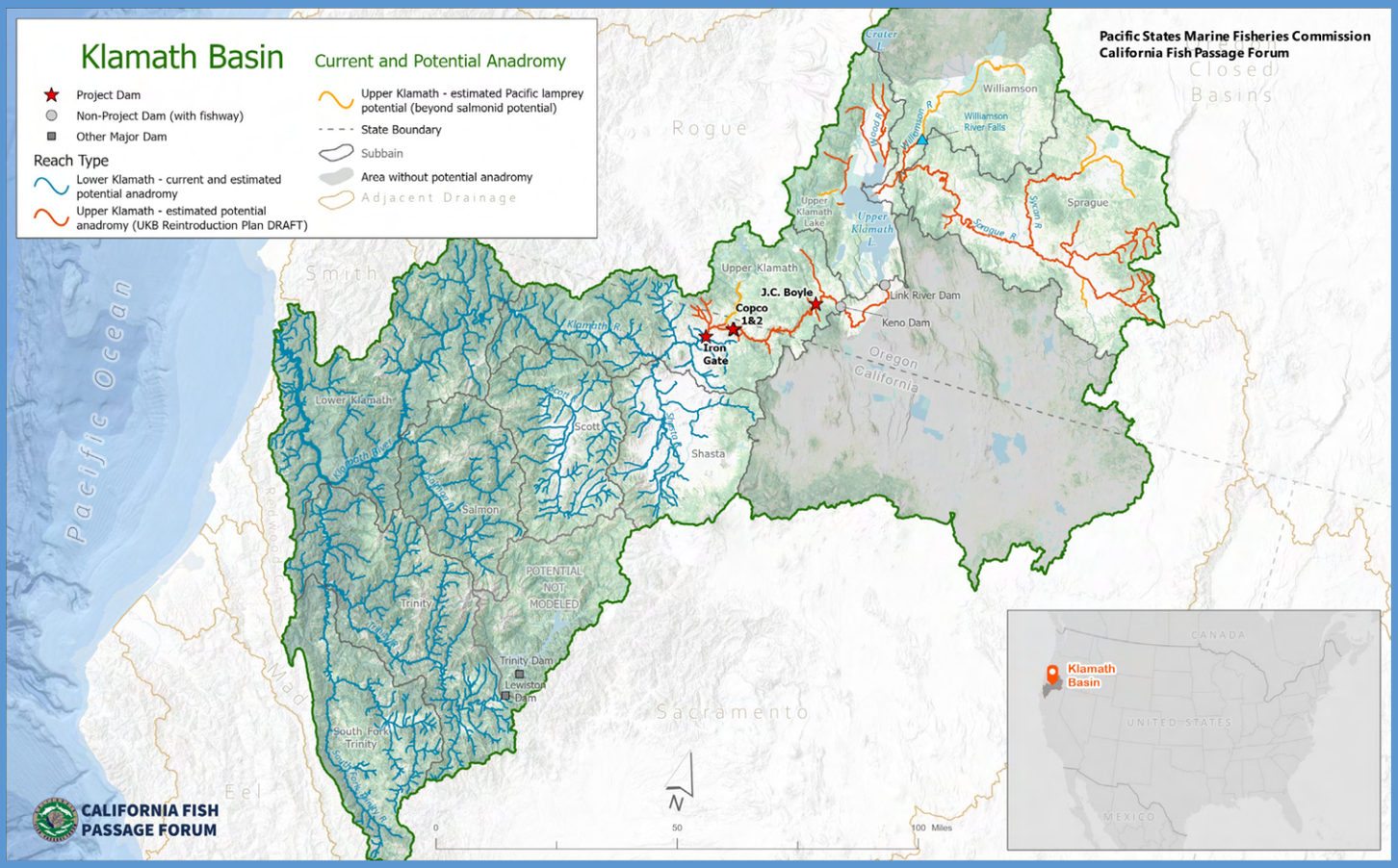


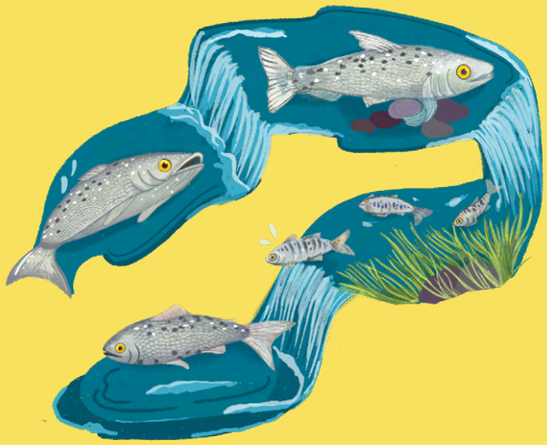
Figure 8. Klamath Basin, the site of four major dam removal projects

Source: California Fish Passage Forum, Klamath River Renewal Corporation, and their partners, (2020).[286] Image used with permission.

286 California Fish Passage Forum, Klamath River Renewal Corporation & their Partners. "Preparing the Klamath Basin for Dam Removal." ArcGIS StoryMaps, December 4, 2020. https://storymaps.arcgis.com/stories/8d96c0764ed44643bad392cb73ef4c54.

REMOVAL OF THE KLAMATH DAM WAS A WIN FOR TRIBES

Constructed from 1903 to 1967, these dams have long caused damage to fish populations, especially salmon, due to ignored requirements to include fish passages. The dams have devastated local Tribes and the local salmon industry. While economic, social, and environmental recovery will take time, salmon will be able to move freely through 420 miles of the lower Klamath upon completion of the dams' demolition in 2024, demonstrating the power of movements to shift our infrastructure and repair ecosystem health.[287]



287 Malia Reiss, "The Science of Saving Salmon as Klamath Dams Come Down," *UC Davis* (blog), February 24, 2023, https://www.ucdavis.edu/climate/blog/science-saving-salmon-klamath-river-dams-come-down.

FISH HAVE BEEN DECIMATED BY CALIFORNIA'S INFRASTRUCTURE

"Each year millions of fish migrating between fresh and salt water to lay their eggs are chewed up in massive turbines, trapped below towering dams, stranded in weak water flows, or 'cooked' in too-warm reservoirs."

(NOAA Fisheries)[288]

Fish populations have been devastated by infrastructure development in California. The situation is particularly dire in the headwaters of the Sierras, in northeastern California, and in the Central Valley, regions in which water has been diverted and over-extracted to supply industrial, agricultural, and urban use. Forty-one percent of native fish species are either extinct or in need of immediate attention to avoid extinction, and 56 percent of Californian inland fish species face increased risk of extinction due to major dams.[289]

288 NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

289 UC Agriculture and Natural Resources, "Western Water."

Figure 9. Present day salmonid habitat and waterways made inaccessible by dams
Source: NOAA Fisheries.[290]

Dams are central to mass-infrastructure water management, but are particularly destructive as physical barriers that inhibit the lifecycle of salmonids (e.g., salmon, whitefish, and trout) that spawn in freshwater, swim to the ocean to mature, and then return to their freshwater birthplaces to spawn the next generation. Of 31 salmonid taxa, 74 percent are in danger of extinction within the next century. Dams in the Central Valley have blocked 80 percent of historical salmon and steelhead habitat and 95 percent of their spawning habitat (see Figure 9).[291] While fish passage barriers (e.g., dams with no passage alternatives like fish ladders) are illegal *de jure*, *de facto* they are extremely common: There are 3,323 known fish passage barriers, and an additional 9,057 sites that may be fish passage barriers but require further examination. In short, infrastructure projects, spurred on by economic and political interests, have progressed illegally, harming fish habitats.[292] And once dams are in place, removing them is an adversarial and lengthy process, during which much harm is done to fish and the

290 NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

291 NOAA Fisheries, "Salmon and Steelhead Habitat Loss in the Central Valley."

292 UC Agriculture and Natural Resources, "Western Water."

broader ecosystem.

Some Californians express frustration when fish are used to push for pausing or ceasing development or water deliveries to farms or cities (in the past, fish have been the main subject of biological opinions for cases involving the Endangered Species Act). But not only are fish intrinsically valuable, they are needed to maintain healthy, balanced ecosystems, act as a barometer of watershed health, and are needed for peoples' subsistence and cultural use.[293]

Climate change exacerbates threats to the survival of fish populations due to increased water temperatures and salinity, toxic algal blooms, and reductions in dissolved oxygen.[294] Agricultural and other runoff also imbalances or poisons waterways, harming fish, the broader ecosystem, and the people and the fishery industries that rely on them. In 2023, California's salmon fishing season was canceled because the populations are too fragile after multiple years of massive fish kills due to human-induced climate change, infrastructure buildout, and industrial harm.

California's mismanagement of water systems and infrastructure development, as well as the associated social outcomes, harms Tribes and fish populations, facilitates unsustainable and profit-driven agriculture, and disproportionately impacts BIPOC through water quality, quantity, and affordability challenges. Climate change introduces increasing uncertainty into this system. Resolving these challenges in a just, sustainable, and resilient way will require new priorities and fresh, bold ideas about water governance. In the next section, we describe a vision for a future in which people, sustainable agriculture, and ecosystems can flourish. Despite lofty goals, supportive policies like SAFER and SGMA, and meaningful progress, California has not yet achieved a Human Right to Water (HR2W) or water justice.

293 West Coast Water Justice, "California's Inequitable Water Rights System and Water Projects"; West Coast Water Justice, "Following the Water: How Dams and Water Shape Tribal Recognition in California."

294 Alastair Bland, "No California Salmon: Fishery to Be Shut Down This Year," *CalMatters*, March 15, 2023, sec. Water, http://calmatters.org/environment/water/2023/03/california-salmon-fishery-shut-down/.

3.
A Vision for Water Justice in California

Prioritizing Water Use Based on Societal Value

Despite lofty goals, supportive policies like SAFER and SGMA, and meaningful progress, California has not yet achieved a Human Right to Water (HR2W) or water justice. Throughout the state's history, profit motives and various forms of racism have long impeded equitable water allocations and the need for environmental flows (water intentionally left in water bodies to support ecosystem health). Water policy, planning, and management must focus on water as part of a broader system of people and the environment, rather than as an isolated commodity that benefits the few.

In our vision, water in California will be prioritized based on relative societal value and need, rather than by market forces and those with outsized power due to an archaic water rights system. We take inspiration from Indigenous Peoples' framing of water as a living and shared resource, as well as movements around the world[295] to decommodify water. For example, in South Africa, the government guaranteed water for basic subsistence needs to all households after the previous pricing policies for water led to a lack of access for water among poorer residents.[296]

Throughout US and California history, governments have prioritized scarce and necessary resources based on broader societal needs. During World War II, President Franklin Delano Roosevelt's War Production Board helped conserve and allocate scarce materials like metals for the war effort. It prioritized items the military needed like guns, tanks, ships, and aircraft by reallocating materials away from nonessential items like cars and luxury items.[297] US factories only built 139 cars during the entire war, despite building about 3 million during the year prior. Similarly, during the first year of the COVID-19 pandemic, the US government used the Defense Production Act to prioritize government orders for critical medical supplies.[298] Finally, California itself prioritized water for agriculture and commerce rather than mining in the 1880s. No resource is more critical to people and the environment than water. And prioritizing water to meet societal needs addresses the challenges of racism, exclusion, and climate change head on.

Below, we outline a model for a tier-based priority system, and a starting point for how to prioritize water within it. We recognize that others may prioritize water differently, and **welcome revisions and restructuring of our proposed framework, especially from movements and communities most harmed by California's legacy of water management based in racism and extractive capitalism.**

Tier 1 of our system, "Basic Needs," prioritizes water to support human subsistence and cultural needs, sustainable agricultural systems (those that account for local climatic conditions, eliminate pollution, and ensure long-term sustainability), and broader ecosystems. In Tier 2, called "Resilience," infrastructure projects, conservation, and aquifer recharge maximize water storage to manage for climate-related challenges and anticipated "weather whiplash." We consider both Tier 1 and Tier 2 to be "essential" water uses — necessary to achieve

295 "Water Remunicipalization Tracker," TIR Toolkit, Tap into Resilience, accessed December 25, 2023, https://tapin.waternow.org/resources/water-remunicipalization-tracker/.

296 Jessica Budds and Gordon McGranahan, "Are the Debates on Water Privatization Missing the Point? Experiences from Africa, Asia and Latin America," *Environment and Urbanization* 15, no. 2 (October 2003): 87–114, https://doi.org/10.1177/095624780301500222.

297 "During WWII, Industries Transitioned From Peacetime to Wartime Production," US Department of Defense, accessed April 29, 2023, https://www.defense.gov/News/Feature-Stories/Story/Article/2128446/during-wwii-industries-transitioned-from-peacetime-to-wartime-production/.

298 FEMA, "Applying the Defense Production Act," press release, January 26, 2021, https://www.fema.gov/press-release/20230510/applying-defense-production-act.

water justice. Tier 3, "Private Luxury Uses," identifies excessive uses to be reduced or eliminated. Table 1 summarizes the goals associated with each tier.

TABLE 1. TIERED MODEL OF WATER PRIORITIZATION FOR ESSENTIAL USES

		Domestic	Industry	Environment
Essential Uses 	Tier 1: Basic Needs	Guarantee safe and affordable water for consumption, cooking, sanitation, subsistence, and cultural uses.[299]	Guarantee water for sustainable agricultural systems.	Provide for healthy ecosystems.
	Tier 2: Resilience	Manage a buffer stock of water and develop flood protection that ensures people, agriculture, and ecosystems can weather long periods of drought, as well as precipitation spikes, through the use of adaptive infrastructure.		
Nonessential Uses 	Tier 3: Private Luxury Uses	Reduce water use for nonfunctional turf and private gardens.	Reduce water use for unsustainable agriculture and other polluting uses. Eliminate water use for fossil fuel extraction and refining.	Reduce water use for human-made landscapes for exclusive recreation or aesthetics (e.g., golf courses).

299 In this table, we include Tribal cultural water uses as domestic uses to recognize them as foundational to Tribal ways of living. However, we discuss and consider these uses as interconnected to environmental water in much of the rest of the report, given their interconnection with ecosystem health.

Democratic Water Governance

Prioritizing water based on societal value begs the question: Who will do the prioritization, and how can it be done equitably? These questions are especially relevant given that California's water management history is marked by exclusion that continues into the present. Today, many small-scale farmers remain unaware of SGMA[300] and large agricultural interests are overrepresented in decision-making, at the expense of the environment[301] and vulnerable groups like drinking water users; low-income communities; and small, underrepresented, and tenant farmers.[302] In 2022 alone, 1,500 wells, many of which are used by Latine farmworkers, went dry[303] because of overpumping of groundwater by industrial agriculture.[304] **For these reasons, our key recommendation is that water management decision-making structures address historical power inequities.**

We believe this goal can best be achieved by representative groups of local community members making water-sharing and investment decisions with an eye to the systems and people of an entire watershed. California has already increased momentum to formalize the inclusion of diverse stakeholders in decision-making, including through California law AB 52 requiring Tribal consultation and SB 535 which, although imperfect, requires targeted investments in low-income communities.[305] In Los Angeles, Watershed Area Steering Committees already develop 5-year Stormwater Investment Plans to recommend investments in infrastructure, technical resources, and scientific studies as part of the Safe Clean Water Program.[306] These steering committees consist of five agency members, five community members, nine subject matter experts, and two nonvoting members.[307] California can build from these successes to develop governance mechanisms that protect basic needs for people and the environment.

We therefore recommend that community watershed governance boards with a historically informed composition of democratically elected members and agency staff manage water resources at a regional watershed level. While we share potential specifics for how this might work, we focus our vision on three guiding principles to ensure that such democratic governance 1) acknowledges and rebalances the power inequities among diverse stakeholders, 2) considers water a shared resource within a watershed, and 3) receives state oversight to verify needs-based prioritization and access to resources.

300 Catherine Van Dyke, "California Agriculture & Water: Farmer Perspectives on Water Access & Governance" (master's thesis, University of California, Berkeley, 2023).

301 Caitrin Chappelle et al., *Achieving Groundwater Access for All: Why Groundwater Sustainability Plans Are Failing Many Users* (Groundwater Leadership Forum, 2023), https://www.groundwaterresourcehub.org/content/dam/tnc/nature/en/documents/groundwater-resource-hub/AchievingGroudwaterAccessforAll.pdf.

302 Chappelle et al., *Achieving Groundwater Access for All*; Ngodoo Atume and Evan Wiig, "Landmark CA Groundwater Policy Neglects Small, Underrepresented Farmers," *Community Alliance with Family Farmers* (blog), June 1, 2022, https://caff.org/sgma-and-small-farms/.

303 California Natural Resources Agency, "Dry Well Reporting System Data"

304 Zoom interview with Nataly Escobedo Garcia, Leadership Counsel for Justice and Accountability, February 28, 2023.

305 Daniel Aldana Cohen et al., "Securing Climate Justice Federally: A Political Economy Approach to Targeted Investments," *Environmental Justice* 16, no. 5 (October 2023): 351–359,https://doi.org/10.1089/env.2022.0047.

306 Los Angeles County Flood Control District, "Safe, Clean Water Program: Watershed Area Steering Committee Operating Guidelines," Los Angeles County Flood Control District, September 19, 2019, https://safecleanwaterla.org/wp-content/uploads/2019/09/Regional-Program-WASC-Operating-Guidelines-20190924-FINAL.pdf.

307 Los Angeles County Flood Control District, "Enclosure C: Safe Clean Water Program Watershed Area Steering Committee Members," Summary of Committee Members, July 23, 2019, https://drive.google.com/file/d/1t2hCIBYMZBXVkklkjVVdhoa0eKNiMZsp/view.

Board composition must consider the historical inequities that shape contemporary influence on water management. Currently, irrigation districts and industrial agricultural interests have the greatest influence in GSAs, and therefore the greatest influence when it comes to shaping current and future groundwater use.[308] These dynamics perpetuate the power of those who own land and water rights, often forcibly taken from others when traced back in time. Meanwhile, the SWRCB management is 68 percent white, whereas California's population is only 43 percent white (according to the state's workforce census data from 2020).[309] Creating a social-value-oriented water prioritization system will require community watershed governance structures that give power to people whose voices the water rights system has historically suppressed.

California attempted to increase collaborative decision-making for water when the legislature passed the Regional Water Management Planning Act in 2002 and subsequent voter-approved bonds to support Integrated Water Resource Management (IWRM) projects in 2002, 2006, and 2014.[310] However, a stakeholder review of the program highlighted the need for stronger representation and involvement of Tribal and low-income communities.[311] Research of the shortcomings of implementing IWRM similarly finds that merely stating the importance of collaboration and integration for watershed governance does not ensure equitable power dynamics, and can even exacerbate or entrench inequalities by excluding informal or future users or by ignoring unequal power or access.[312]

However, investments in community capacity to foster democratic participation and equity,[313] along with state-developed safeguards, can ensure that public participation is not diluted nor symbolic in how governance bodies function.[314] Learning from the experience of Watershed Area Steering Committees (WASCs) in Los Angeles, we believe the following steps can foster equitable democratic participation in California:

- Community members represent at least one-third of board members;
- Agency staff, together with community members, comprise a majority of board members;
- Community members receive technical training and compensation for participating;
- One board member acts as a "community advocate" — a publicly funded, technical, nonvoting member whose job is to work collaboratively with the community to identify,

308 Zoom interview with Nataly Escobedo Garcia, Leadership Counsel for Justice and Accountability, February 28, 2023.

309 Lee et al., *Updating California Water Laws to Address Drought and Climate Change*.

310 California Department of Water Resources, *Stakeholder Perspectives: Recommendations for Sustaining and Strengthening Integrated Regional Water Management* (Sacramento, CA: California Department of Water Resources, March 2017), https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Integrated-Regional-Water-Management/Files/stackholder_perspectives_IRWM_Recommendations_a_y19.pdf.

311 Department of Water Resources, *Stakeholder Perspectives*.

312 Megan Mills-Novoa, "Understanding Water Policy as Agricultural Policy: How IWRM Reform Is Reshaping Agricultural Landscapes under Climate Change in Piura, Peru" (Thesis, University of Arizona, 2016), https://www.proquest.com/openview/2dd02e65960dd39aa9682ccdec0fdbf8/1?pq-origsite=gscholar&cbl=18750.

313 Rosa González, *The Spectrum of Community Engagement to Ownership* (Oakland, CA: Movement Strategy Center, August 2021), https://movementstrategy.org/wp-content/uploads/2021/08/The-Spectrum-of-Community-Engagement-to-Ownership.pdf.

314 Ken Conca, *Governing Water: Contentious Transnational Politics and Global Institution Building* (Cambridge, MA: MIT Press, 2005), https://mitpress.mit.edu/9780262532730/governing-water/; Mills-Novoa, "Understanding Water Policy as Agricultural Policy: How IWRM Reform Is Reshaping Agricultural Landscapes under Climate Change in Piura, Peru."

plan, and seek funding for community-driven projects;[315] and

- Community members have final say in some decisions (e.g., public engagement strategy, developing equity programs, etc.).

While we believe these recommendations can help overcome certain informal barriers to community watershed governance (such as lack of confidence or technical understanding), they will not be enough on their own to reverse long-standing power inequities. Different places and people may also have different needs and different access to resources. Developing functional natural resource management institutions is a difficult process that is most successful through experimentation among members.[316] Likewise, we believe the most effective community watershed governance boards for achieving just outcomes will evolve and improve over time to overcome local challenges.

These community watershed governance boards should also have jurisdiction over the water in an entire watershed[317] or groundwater basin. This watershed-wide governance approach is another principle of the internationally promulgated IWRM paradigm. IWRM "promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems."[318] This approach takes a systemic (river basin or watershed-level) approach to management that has been endorsed by the United Nations as a tool to adapt to climate change.[319]

Figure 10. Watersheds of California

Source: Robert Szucs, Grasshopper Geography.[320] Image used with permission.

315 "Watershed Coordinators," Safe Clean Water Program, accessed December 25, 2023, https://safecleanwaterla.org/watershed-coordinators/.

316 Peter J. Hill and Shawn Regan, "Chapter 1: Resource Governance in the American West: Institutions, Information, and Incentives," in *The Environmental Optimism of Elinor Ostrom (Logan, UT:* The Center for Growth and Opportunity at Utah State University, 2023), https://www.thecgo.org/books/the-environmental-optimism-of-elinor-ostrom/chapter-1-resource-governance-in-the-american-west-institutions-information-and-incentives/.

317 We suggest starting with hydrological unit code 8, which would separate California into 126 regions, and then scaling the units to be larger and smaller as needed, or as recommended by communities

318 Global Water Partnership Technical Advisory Committee, *Integrated Water Resources Management* TAC Background Papers (Stockholm, Sweden: Global Water Partnership, March 2000), https://www.gwp.org/globalassets/global/toolbox/publications/background-papers/04-integrated-water-resources-management-2000-english.pdf.

319 Cap-Net, *IWRM as a Tool for Adaptation to Climate Change* (Stockholm, Sweden: Cap-Net, July 2009), https://www.floodmanagement.info/publications/manuals/Cap-Net%20IWRM%20Adaptation%20to%20Climate%20Change%20Tool.pdf.

320 Robert Szucs,*California - River basin map, rainbow on white - fine art print*, accessed February 25, 2024, https://www.grasshoppergeography.com/collections/north-america/products/river-basin-map-of-california-with-white-background-fine-art-print?_pos=22&_fid=61ae1b36d&_ss=c.

This watershed-wide management approach aligns incentives to pursue an integrated approach that cuts across arbitrary city and county lines, avoids the pitfalls of having multiple GSAs govern the same basin, and helps resolve the disconnect between groundwater and surface water management. This approach considers the costs and benefits to all users when determining when to invest in projects to increase water supply, reduce demand, or improve water quality. When water crosses watersheds via groundwater basins or conveyance, the community watershed governance boards for each basin should work together to identify optimal allocations across these basins, with the state reviewing and adjusting allocations based on key justice criteria.

Finally, the state's legal authority should provide a backstop to ensure water allocations align with prioritizing essential uses and resilience. California should require that community watershed governance boards prioritize water allocations first to essential uses and only then to private luxury uses in accordance with a tiered system like the one we propose. The state should then have the power to review and update these allocation plans. SGMA already features a similar mechanism through which GSAs submit plans to the state for review and approval, with the SWRCB authorized to rewrite inadequate plans.[321] Our proposal extends this model from SGMA to prioritized allocations coming from new community watershed governance boards.

321 Pitzer, "Explainer: The Sustainable Groundwater Management Act: The Law, The Judge And The Enforcer"

4.
Recommendations for Achieving a Just Water Future

Below, we outline recommendations that build toward the vision we describe above, in which all people have reliable and affordable access to water to meet their basic needs, Tribes gain federal recognition and access to the land and water they stewarded for centuries or millennia, agriculture uses water in ways that improve soil and water quality while growing healthy food, and ecosystems thrive in ways that support water quality, pollination, migratory species, and more.

We organize our recommendations as follows. We outline recommendations for Tiers 1 to 3 (Basic Needs, Resilience, and Private Luxury Uses) by sector (domestic, industrial, and environmental). Within each sector and need tier, we separate recommendations into current implementation, incremental reforms, and systemic reforms. Current implementation refers to ways to best implement existing policies. Incremental reforms improve upon existing policies and can provide some benefits, but do not address underlying issues.

Finally, systemic reforms shift the water management paradigm toward more just decision-making processes and outcomes for all users. A summary of our key recommendations is below.

TABLE 2. SUMMARY OF HISTORICAL AND CONTEMPORARY CHALLENGES AND RECOMMENDATIONS

Domain	Summary of Core Challenges to Address		Summary of Key Recommendations
	History of Racial Capitalism	Current State	
Domestic 	Redlining and stealing of land has driven economic marginalization by pushing BIPOC to areas with polluted water and/or minimal investment in water infrastructure.	BIPOC face the brunt of pollution challenges, water debt, shutoffs, dry wells, and new water costs — especially as the climate crisis hastens the need to find more expensive water supplies.	**Leverage federal and state funds** for drinking water supply and contamination projects, particularly in communities with unsafe or unreliable water supply. **Use more progressive rate structures for water** to ensure basic needs are low cost or, ideally, free. **Bring underrepresented community voices into decision-making** through stipends, technical training, and increased decision-making power.
Agriculture & Industry 	Water was prioritized for large industrial monoculture agriculture due to profitability and power of large growers.	Water is still prioritized for industrial agriculture, and there is a “race to the bottom of the well” to make money before SGMA requires sustainable groundwater use.	**Change financial incentives** so climate-friendly, sustainable crops are more highly incentivized than those that harm water and ecosystems. **Increase water quality standards** to improve or replace polluting and inefficient farming practices. **Couple investments with high-road labor requirements** that improve worker pay, skills, and working conditions.

Tribes 	Land (and associated water) were seized during the settler drive to irrigate the West, and subsequent dam construction often harmed ecosystems historically stewarded by Tribes.	Despite some improvements through advocacy and organizing, in many cases Tribes are still without land or access to healthy water and ecosystems.	**Facilitate Tribal recognition** and the return of Tribal lands. **Encourage Indigenous Traditional Ecological Knowledge** when planning and comanaging resilient infrastructure investments. **Prioritize Indigenous perspectives in water governance bodies.**
Fish & Ecosystems 	Settlers constructed dams and water infrastructure that impeded fish travel and harmed ecosystems, and environmental protections implemented in the 1970s have been insufficient or too slow.	Many fish species are on the precipice of extinction, and climate change further threatens their ecosystems.	**Prioritize green infrastructure like** underground water storage, wetlands, etc. **Remove dams where feasible**, and increase feasibility of doing so over time through green infrastructure investments. **Require more extensive and holistic water quality criteria** beyond minimum flow (volume) requirements, such as temperature and salinity requirements.
Cross-Cutting Recommendations 	"Senior" water rights holders took land and water from disadvantaged people, accumulating wealth while excluding BIPOC from land, water, "good jobs," and legal recourse.	Water flows to the most profitable, often unsustainable or polluting, uses based on an archaic water rights system that entrenches existing power and privilege.	**Increase SWRCB actions to prioritize water** in alignment with meeting human needs and resilience goals. **Require transparent, real-time reporting** of water withdrawals to enable better decision-making. **Reduce the amount of water allocated through an archaic water rights system** through new laws that diminish the absolute and permanent nature of those rights.

Tier 1: Recommendations for meeting basic needs

DOMESTIC USES: MEETING WATER NEEDS AT HOME

Domestic water represents about 10 percent of California's annual water use, and includes the water people use for their basic needs as well as private luxury uses like watering lawns. Domestic users include all people like Tribal, urban, and rural communities. Though California has passed the HR2W into law (after at least a decade of organizing) to meet basic needs for clean and affordable water for cooking, cleaning, and consumption, this promise has not been met. Below, we outline steps California can take to better realize the HR2W and achieve water justice, with an emphasis on making water free for people's basic needs.

Current Implementation - Domestic uses

DWR should reject GSPs that do not ensure water availability for meeting minimum domestic needs. California should also continue consolidating water systems where feasible to increase the resources (technical expertise, managerial expertise, and financial resources) available to smaller communities to address water quantity and quality challenges. Even when such projects are completed, small communities often struggle to provide funding for ongoing maintenance and operations of these water projects.[322] California should take better advantage of SAFER's funding flexibility to cover operational costs to achieve project benefits into the future.

The state must also continue leveraging funding from many available sources to provide updated infrastructure and clean water to (often rural) communities that lack it. SAFER funding has the advantage of coming with few strings attached, and can more flexibly meet local needs, including for ongoing costs. The IIJA makes around $1 billion available for rural water projects through the Bureau of Reclamation,[323] and the IRA makes $550 million available for domestic well users from under-resourced communities to plan, design, or construct projects.[324] These IRA funds can cover 100 percent of project expenses, eliminating match requirements that disproportionately leave behind smaller communities with fewer ratepayers. California can also leverage money in the State Revolving Funds (now better funded due to the IIJA) to support projects in under-resourced communities, with an emphasis on grants and other subsidies for the lowest-income and most vulnerable communities. California must strategically deploy funds from the SRFs, IIJA, IRA, and SAFER to meet the variety of needs communities face, while prioritizing grants to the most under-resourced communities and providing more water supply sources to cities — without worsening affordability for low-income ratepayers.

Incremental Reforms - Domestic uses

California must ban water shutoffs, which disproportionately harm BIPOC and create or add to mental and physical health burdens. In addition, the state must cancel all water debts; people taking on debt to obtain a resource that is a human right is an inherent contradiction. While water supply faces an investment gap given California's various water challenges, this gap should not be filled at the expense of people who are disproportionately low-income and BIPOC.

California must repeal Prop 218 or pass another

322 Zoom interview with Evan Jacobs, California American Water, March 27, 2023.

323 Charles V. Stern and Anna E. Normand, Bureau of Reclamation Provisions in the Infrastructure Investment and Jobs Act (P.L. 117-58) (Washington, DC: Congressional Research Service, February 2022), https://crsreports.congress.gov/product/pdf/R/R47032.

324 Jake Glassman, Sophia Hill, and Wendy Jaglom-Kurtz, "Breaking Down the Inflation Reduction Act. Program by Program. Incentive by Incentive," Rocky Mountain Institute, April 11, 2023, https://rmi.org/breaking-down-the-inflation-reduction-act-program-by-program-incentive-by-incentive/.

law to explicitly legalize budget-based water rates at all California water utilities. This kind of pricing structure ensures that water costs the least for basic use, and increases costs for private luxury uses like excessive outdoor landscaping. In this way, these budget-based rates would allow public utilities to implement progressive water rates that can support conservation among over-users and allow for lower pricing of water to meet the most basic human needs for all utility customers.

California should also find a permanent funding mechanism for SAFER since small communities do not have the ratepayer base to fund their systems affordably. In addition, the state should provide incentives for people to install water-efficient appliances, including full-cost grants for low-income households. Saving water also saves the energy needed to treat, transport, and heat that water.[325]

We also echo Lee et al.'s call to require GSAs to be expressly responsible for mitigating adverse effects they have on adjacent domestic well users, compensating them, and ensuring they get access to water resources (through deeper wells, municipal water hookups, or otherwise covering associated energy and hookup costs to access alternative water supplies).[326]

Systemic Reforms - Domestic uses

California should also increase the quantity and quality of community input into GSA processes. Some steps to take include reserving at least one-third of board seats for community members, BIPOC farmers (especially workers or those owning small plots of land), and Indigenous leaders local to the area while ensuring that community members plus agency staff comprise a majority of voting members. Everyone who participates without compensation for doing so through their job should receive stipends for their time and insight. To further elevate community voices, we also recommend creating a designated technical expert in a "community advocate" role, giving community members the final say in some decisions (e.g., public engagement strategy, structuring equity programs, etc.), and providing technical training for all GSA members, including on California's Human Right to Water law and principles of equity and justice. Similar mechanisms have had some success in Watershed Area Steering Committees in Los Angeles.[327] Over time, such community watershed governance mechanisms should continue to evolve to meet community needs and elevate community voices. They should also take hold beyond GSAs in agencies that manage surface water, and boards managing overlapping surface water and groundwater jurisdictions should coordinate to best prioritize water use and funding in ways that consider their interdependence.

Repealing Prop 218 would provide a foundation for making water free for basic usage through progressive water rates and/or progressive taxation. These changes should be made revenue-neutral or revenue-positive so that utilities can invest in updated water infrastructure. Progressive taxation may be preferred to progressive rates if funding can be secured in a way that avoids an annual appropriations process. Such a funding mechanism would better ensure water as a human right. Free allocations for basic needs should remain in place even during times of drought (rather than increasing rates with drought surcharges which most harm low-income households). Steep increases in pricing beyond basic usage would also incentivize continued conservation.

325 Julia K. Szinai et al., "Evaluating Cross-Sectoral Impacts of Climate Change and Adaptations on the Energy-Water Nexus: A Framework and California Case Study," Environmental Research Letters 15, no. 12 (December 2020): 124065, https://doi.org/10.1088/1748-9326/abc378.

326 Lee et al., Updating California Water Laws to Address Drought and Climate Change.

327 Zoom interview with Lauren Ahkiam, Los Angeles Alliance for a Clean Economy, July 12, 2023.

INDUSTRIAL USES: MEETING WATER NEEDS FOR FARMS

Industrial water use includes water for growing food (given that most current production is from industrial crop monocultures) and various mining or manufacturing processes including fracking and oil refining. Our recommendations focus on agriculture because it represents about 40 percent of the state's water use.

California's agricultural market has been changing in the last few decades due to price signals from international markets,[328] water scarcity,[329] and farm labor availability.[330] As these factors continue to evolve, so will agriculture in California. **Our recommendations aim to ensure that future changes improve environmental sustainability (including water use) while also improving livelihoods of farmworkers and those who have been harmed by past land and water policies.** For example, transitions that increase the availability, safety, and affordability of water cannot come at the expense of devastating loss of rural employment or of land fallowing and then producing airborne dust harmful for human health.[331]

In terms of water and sustainability, we use a short-hand of sustainable agricultural systems to discuss those aligned with the local environment (precipitation, soil type, etc.) that are not polluting and could endure in perpetuity. Sustainability might also depend on multiuse frameworks. For example, a crop may be ill-suited to the environment in a monocrop system, but well-suited for a multi-crop system underneath solar panels. Models that subsidize and support multiuse agriculture can also benefit small farms, which provide positive externalities in the form of biodiversity, higher yields, and culturally important produce.[332] Qualified scientists, Indigenous Peoples, and farmers using traditional practices should work with state support to determine suitability of different agricultural practices in different regions of the state. This approach mirrors the New Deal's Regional Adjustment Project, in which teams of researchers divided states into type-of-farming areas and made determinations about sustainable crops and methods, which were implemented through the passage of the Soil Conservation and Domestic Allotment Act of 1936.[333]

To improve worker livelihoods, we look to industrial policy approaches, which target investments to desired industries with equity and labor standards. All policies driving toward sustainable agricultural systems must be paired with a high-road labor approach that ensures livable wages, skill-building, and community benefit mechanisms.

328 Gebremichael et al., "What Drives Crop Land Use Change during Multi-Year Droughts in California's Central Valley?"

329 Gebremichael et al., "What Drives Crop Land Use Change during Multi-Year Droughts in California's Central Valley?"

330 Hanak et al., Water and the Future of the San Joaquin Valley; James F. Booker and W. Scott Trees, "Implications of Water Scarcity for Water Productivity and Farm Labor," Water 12, no. 1 (January 2020): 308, https://doi.org/10.3390/w12010308.

331 Sarah Bardeen, "Dangers Lurk in the San Joaquin Valley's Dust," Public Policy Institute of California (blog), January 10, 2022, https://www.ppic.org/blog/dangers-lurk-in-the-san-joaquin-valleys-dust/.

332 Chia Thao et al., "Pesticide Knowledge, Attitudes, and Practices Among Small-Scale Hmong Farmers in the San Joaquin Valley of California," ed. Tom Royer, Journal of Integrated Pest Management 10, no. 1 (January 2019): 32, https://doi.org/10.1093/jipm/pmz030; Vincent Ricciardi et al., "Higher Yields and More Biodiversity on Smaller Farms," Nature Sustainability 4, no. 7 (July 2021): 651–57, https://doi.org/10.1038/s41893-021-00699-2; Fernandez-Bou et al., "Water, Environment, and Socioeconomic Justice in California."

333 Jess Carr Gilbert, Planning Democracy: Agrarian Intellectuals and the Intended New Deal, Yale Agrarian Studies Series (New Haven, CT: Yale University Press, 2015).

INDUSTRIAL POLICY OVERVIEW

During the past few years, federal policy has shifted toward industrial policy approaches that use state fiscal and regulatory authority to develop desirable industries and provide a just transition for workers in damaging and exploitative industries. Bigger and Strecker argue that green industrial policies should be guided by three principles: 1) targeting public investments in low-income, frontline, and communities of color; 2) linking public investment to climate targets; and 3) coupling public investments that benefit private businesses with equity and labor requirements that nurture coalitions of labor, racial, and environmental justice groups.[334]

By directing resources toward desirable industries with high labor standards for workers, green industrial policy can help ensure long-term, skilled employment that can provide the multiracial working class with family-sustaining jobs that break cycles of poverty.[335] These practices constitute an investment-forward approach to solving public policy problems combined with a "high-road" approach to labor. High-road labor practices develop specific or increasing labor skills and pair those skills with high pay and good benefits.[336] High-road labor uses mechanisms like labor-management partnerships (skill-building strategies to develop career pipelines), community workforce agreements (which guarantee local hiring and apprenticeships), prevailing wage requirements (putting union workers on equal footing with nonunion workers), and community benefit agreements (which ensure project revenues benefit nearby communities). Green industrial policy can put these requirements into action by, for example, including procurement rules that require firms building infrastructure to hire from within the local community and pay prevailing wages. Taken together, these approaches can address the limitations of one-time investments and fight racism by raising the floor of community investment, improving labor conditions, and increasing workforce skills, especially among those who have been historically marginalized.[337]

334 Patrick Bigger and Jesse Strecker, "Primer: Green Industrial Strategy for Just Transitions," (Climate and Community Project, April 2023),, 17,. https://www.climateandcommunity.org/green-industrial-strategy.

335 Cohen et al., "Securing Climate Justice Federally."

336 Zabin et al., "Putting California on the High Road: A Jobs and Climate Action Plan for 2030."

337 Cohen et al., "Securing Climate Justice Federally."

Current Implementation - Industrial uses

California should leverage existing financial incentives and technical support so farmers can reduce pollution and water-intensive farming. For example, the United States Department of Agriculture's (USDA) Regional Conservation Partnership Program supports projects for incremental improvements, like planting riparian buffers to improve water retention, reduce soil erosion, and benefit wildlife. Some polluting and water-intensive farmland can also be converted to other uses. For example, projects to produce zero-

carbon electricity receive a 30 percent tax credit[338] and California's 30x30 program to conserve 30 percent of California's land for habitat by 2030 can provide opportunities for rewilding ecosystems and Indigenous stewardship of that land. Any such transitions of farmland to renewable energy generation and ecological restoration should be accompanied by provisions for high-road labor and community benefits that provide quality employment, revenue-sharing, and skill-building for farmworkers and other under-resourced rural communities that would otherwise be harmed by displacement.

California should also continue leveraging its State Water Efficiency & Enhancement Program (SWEEP) to implement more water-efficient irrigation systems. Although efficiency is not a panacea — efficiency is often overstated due to reduced seepage of water into underground aquifers and the repurposing of saved water for planting more crops[339] — more efficient irrigation does reduce water lost to evaporation. These savings can also support recharging groundwater intentionally on unpolluted recharge fields rather than as a coincidence on irrigated fields polluted by pesticides and herbicides while in cultivation.

Incremental Reforms - Industrial uses

California should also implement various green industrial policy approaches that drive more sustainable farming practices and a more favorable land-use strategy that incorporates renewable energy generation, groundwater recharge, and ecosystem health. For example, **subsidies for adoption of particular goods or practices through tax credits or direct payments** can internalize the positive externalities of more beneficial agricultural production practices. Some examples of systems to subsidize might include:

- Agrovoltaic systems — growing crops underneath solar panels;
- Responsible aquifer recharge alongside organic crop production — locating aquifer recharge where there are fewer chemicals that could leach into groundwater;
- Intercropping systems — mixing crops in fields so they benefit each other through symbiotic relationships, reduced soil erosion, and more;
- Dry farming — using practices that allow for growing crops with minimal irrigation in times with little expected rainfall;
- Cover crops and rotational systems — improving soil health by rotating crops grown on various fields; and
- Regenerative organic practices — practices that focus on regenerating soil health and the farm ecosystem (including some of the practices mentioned above).

California can also provide **gap-filling financing** (like pay-as-you-go models) **or protective financial instruments** (like insurance) to improve the feasibility, risk profile, and projected returns of sustainable practices mentioned above. For example, transitioning from conventional chemical inputs to organic production may require three years of reduced yields and profits as chemicals leave the soil (so certification and its revenue returns are not yet possible).[340] Similarly, risk protective instruments can play a key role. Organic producers risk losing certification if floods with agricultural or other forms

338 "Federal Solar Tax Credits for Businesses," Solar Energy Technologies Office, Office of Energy Efficiency and Renewable Energy, updated August 2023, https://www.energy.gov/eere/solar/federal-solar-tax-credits-businesses.

339 Louis Sears et al., "Jevons' Paradox and Efficient Irrigation Technology," Sustainability 10, no. 5 (May 2018): 1590, https://doi.org/10.3390/su10051590.

340 "How to Transition Your Farm, Ranch or Business to Organic" Organic Transitioning, USDA Agricultural Marketing Service, accessed October 22, 2023, https://www.ams.usda.gov/services/organic-certification/transitioning-to-organic; In person interview with Catherine Van Dyke, Community Alliance with Family Farmers, April 21, 2023.

of runoff or pesticide drift contaminate their fields.[341] Financing designed to protect farmers from such shocks can help change the financial returns and risk profile of such a transition. Similar approaches can benefit farmers transitioning to other sustainable cropping systems.

California can also provide incentives for sustainable systems by **guaranteeing purchases for those growing crops using sustainable practices.** For example, California's existing farm-to-school program could prioritize sustainable crops as it looks to grow its impact through public schools,[342] which are the largest restaurant system in the state.[343] These programs may also benefit from greater supply of healthy produce given that they increasingly incentivize use of local fruits and vegetables.[344]

In addition to support for specific practices, more efficient and sustainable agriculture will require technical support and regional infrastructure for saving locally adapted seeds and for food processing and distribution. Currently, most California farmers use wheat seeds either from the Imperial Valley (where farmers have water rights that allow for flood irrigation) or from the Midwest, both of which are ill-suited to California's climate because they are adapted to receiving summertime irrigation or rain.[345] Transplanting farming practices across regions in this way contributed to the Dust Bowl almost 100 years ago.[346] Farming with locally adapted seeds in an intercropping system allows farmers to grow the same quality of wheat with less than 10 percent of the water.[347] However, continued legal support is needed to ensure these seeds remain unpatented and legal to save, and local seed banks can make them widely available.[348] Similarly, local infrastructure for processing and distribution can support guaranteed state purchases without significant friction in transporting food. These investments to better adapt farming to the local climate are critical for a more vibrant and locally suited agricultural sector, especially as climate change makes farming more challenging. We recommend such regional infrastructure and technical support to adopt sustainable practices be developed alongside small, tenant, and underrepresented farmers — groups disproportionately excluded from decision-making processes.[349]

Going beyond incentives for sustainable agriculture, researchers argue that increasing standards are needed to improve currently polluting and inefficient agricultural practices or force them to give way to more sustainable practices.[350]

341 "Preventing and Dealing with Pesticide Drift on Organic Farms," Midwest Organic Services Association, accessed October 22, 2023, https://mosaorganic.org/education-resources/organic-cultivator-newsletter/preventing-and-dealing-with-pesticide-drift-on-organic-farms; Jim Riddle, Impact of Flooding on Organic Food and Fields (University of Minnesote, n.d.), https://www.iatp.org/sites/default/files/102_2_99846.pdf.

342 Office of Governor Gavin Newsom, "On Earth Day, First Partner Jennifer Siebel Newsom Works to Grow Impact of California's Farm to School Program," news release, April 23, 2023, https://www.gov.ca.gov/2023/04/22/on-earth-day-first-partner-jennifer-siebel-newsom-works-to-grow-impact-of-californias-farm-to-school-program/.

343 Carolyn Jones, "Goodbye Hotdogs, Hello Vegan Masala: California's School Lunches Are Going Gourmet," CalMatters, August 10, 2023, sec. K-12 Education, http://calmatters.org/education/k-12-education/2023/08/school-lunches/.

344 "Market Match | Making Fresh Affordable," Market Match, accessed May 3, 2023, https://marketmatch.org/.

345 Zoom interview with Mai Nguyen of the California Grain Campaign and Minnow, August 2, 2023.

346 Gilbert, Planning Democracy.

347 Zoom interview with Mai Nguyen of the California Grain Campaign and Minnow, August 2, 2023.

348 Zoom interview with Mai Nguyen of the California Grain Campaign and Minnow, August 2, 2023.

349 Atume and Wiig, "Landmark CA Groundwater Policy Neglects Small, Underrepresented Farmers."

350 Ryan Ackett et al., "A Green New Deal for Agriculture in the United States" (Climate and Community Project, Forthcoming).

Specifically, they recommend increasing standards for water quality that would require reductions in fertilizers, pesticides, and waste runoff from concentrated animal feeding operations (CAFOs). Regulatory standards should be paired with incentives for sustainable agriculture to ensure desired objectives for pollution reduction and human nutrition are met.

Financial support, building out regional food infrastructure, and increasing standards will make agriculture in California better suited to the local climate, more water efficient, and less polluting. Researchers found that such changes to optimize crop mixtures across the Western US could maintain agricultural revenues while reducing water use by 28 to 57 percent.[351] However, history has shown that such shifts and farm subsidies often benefit owners without benefiting farmworkers — as occurred when plantation owners took land out of production to receive payments from the Agricultural Adjustment Administration without sharing payments with their tenants.[352] Thus, all financial support for sustainable agriculture must be paired with labor standards to ensure workers reap benefits in the form of higher wages, new skills, and better job quality.

Furthermore, policies that grow sustainable agriculture will likely bring sensitive agricultural land, such as wetlands, erodible land, environmentally sensitive areas, and marginal lands, out of production. Recognizing that these shifts will impact farmworkers and that transitions will not be seamless, we recommend creating displaced worker funds and wage insurance to ensure people receive support to cover their needs. We also believe these shifts to new land uses, like ecosystem restoration, renewable energy generation, and creation of public parks, should be seen as opportunities to diversify rural economies, increase community resilience, and provide a variety of new job opportunities in farmworker communities. California should develop policies to ensure these transitions create high-skill and high-wage jobs that provide additional pathways to the middle class — the more pathways, the better.

Systemic Reforms - Industrial uses

A critical systemic reform California can make for better water management is returning land to Indigenous Peoples and their stewardship. To support this goal, the state should recognize all unrecognized Tribes and lobby the federal government to provide these Tribes with federal recognition. Not only is this the right thing to do given California's history of stolen land, these efforts could also benefit soil and farm-working conditions. For example, Indigenous management practices helped build up the fertile soil in the Central Valley today, and Indigenous forest management[353] can help prevent wildfires that pollute water and air, affecting crops and workers. California has already taken some steps in this direction, for example by returning Blues Beach to Indigenous people[354] and funding a $100 million program to return land to Indigenous stewardship.[355] Such efforts should be accelerated and improved based on leadership and feedback from Indigenous communities.

351 Richter et al., "Alleviating Water Scarcity by Optimizing Crop Mixtures."

352 Gilbert, Planning Democracy.

353 Sara Nelson et al., High Roads to Resilience: Building Equitable Forest Restoration Economies in California and Beyond (Climate and Community Project and University of British Columbia Centre for Climate Justice, August 2022), https://www.climateandcommunity.org/_files/ugd/d6378b_2a9170a48b954886811469e29291ddaf.pdf.

354 California Senator Mike McGuire, "McGuire's Historic Legislation Transferring Sacred Blues Beach Property Back to Mendocino County Tribes Signed by Governor Newsom," news release, September 24, 2021, https://sd02.senate.ca.gov/news/2021-09-24-mcguire%E2%80%99s-historic-legislation-transferring-sacred-blues-beach-property-back.

355 "Tribal Nature-Based Solutions Program," California Natural Resources Agency, accessed December 25, 2023, https://resources.ca.gov/Initiatives/Tribalaffairs/Tribal-Nature-Based-Solutions-Program.

A quota system — which sets an upper limit on a crop's production — could help limit the overproduction of unsustainable crops. Any such quota system should take care to reduce the entrenchment of wealth and power. Some ways to do this may include requirements for sustainable farming practices and high-road labor, as well as providing preference for women and BIPOC farmers in the form of discounted permits or set-asides. These mechanisms can also provide oversight to ensure that the most powerful and wealthy interests do not monopolize specialty crops, and auctions could provide sustainable funding for other equity-building programs like SAFER.

Versions of such a system are currently used to grow sugar beets and cranberries in the US and for milk production in Canada. In these systems, the state auctions permits to produce certain agricultural commodities that rely on government subsidies. Such a system could be adapted to specialty crops if only limited amounts of water used for growing specialty crops could be considered "beneficial use" in the future. Limiting permits to grow these crops could prevent overproduction and in doing so ensure high prices that support transitions to more sustainable practices that reduce pollution and water use.

California can also address systemic disparities in farming by providing financial and technical support to buy and convert farmland into worker-owned co-ops. Such co-ops can address historical imbalances in land access and land tenure, and historically excluded groups like women, BIPOC, and farmers using traditional methods involving diverse crop types and management should receive preference for joining. Such systems will return power to workers and provide them with greater income. Because farming is historically a financially volatile way to make a living, continued efforts to de-risk sustainable practices and improve workers' lives through subsidized insurance products and/or guaranteed income for people using sustainable farming practices will be critical to a just and healthy transition for agricultural workers and lands.

ENVIRONMENTAL "USES": ENSURING WATER FOR ECOLOGICAL HEALTH

Environmental water "uses" must provide for healthy ecosystems that protect cultural resources, clean the air and water, provide habitat for diverse species, and allow natural systems to self-regulate. They should also reduce the necessity and cost of building "gray" (or concrete-based) infrastructure for water purification, flood protection, and other climate adaptations. Finally, these uses should preserve environmental spaces for subsistence, cultural use, and recreation through comanagement with Indigenous Peoples. In particular, these approaches should avoid "fortress conservation," which separates people and ecosystems. Overall, we intend for our recommendations to support Tribal stewardship of land and water to the benefit of current and future generations. We place the term "uses" in quotes here, as we recommend that the framing of water resources, particularly for the environment, be shifted away from the framework of usage, and more toward long-term availability for many cultural and subsistence purposes. Through the rest of this section, we use the term "ecological health" in place of "use" to the extent possible.

Current Implementation - Ecological Health

The SWRCB should continue to recognize "beneficial uses" of water that protect watershed resilience and cultural and subsistence use. California's 30x30 initiative must strategically purchase or otherwise protect land and water with the highest habitat value, partnering with local Tribal groups to strategize, plan, and manage these recovered lands. California should also leverage funding from the IIJA for ecosystem restoration, watershed management, watershed health, and endangered species to

support these efforts.

Incremental Reforms - Ecological Health

California should change its laws to allow ecosystems to receive more than current "minimum flow" requirements and instead meet other health criteria for healthy ecosystems. We expect this will include periodic flooding, higher average flows, and other metrics including temperature, salinity, and concentrations of contaminants such as fertilizers. The United States Geological Survey operates a network of 13,000 sensors that continually measure many of these water conditions.[356] The exact criteria should be determined by qualified environmental scientists, in partnership with local Tribal groups. Environmental allocations should also be specific to the needs of particular ecosystems.

California should strengthen the implementation and enforcement of Tribal consultation requirements, and find ways to evolve this into comanagement arrangements. Ideally, new infrastructure that increases local water supply and resilience for large municipalities that stole land and water from Indigenous groups should be used to return stolen land and water to Indigenous ownership, access, and stewardship. For example, completing the Hyperion wastewater treatment plant in Los Angeles should enable returning Indigenous land and water in the Owens Valley.

We also support recommendations made by Lee et al. to authorize the SWRCB to issue interim relief orders that consider reasonable use, the Public Trust Doctrine, water quality objectives, etc. during drawn out litigation.[357] Such interim relief can protect the environment while lawsuits resolve in the courts. Endangered salmonids affected by dams and hotter temperatures should also be explicitly protected by updating Fish and Game Code Section 5937 to include temperature protections.[358]

Systemic Reforms - Ecological Health

To address environmental challenges systemically, water bodies themselves must gain rights to exist as bodies of water. This approach would build from Ecuador's effort to give nature itself rights, with the idea that people must live in harmony with nature.[359] Such rights would ensure water bodies receive clean and adequate amounts of water to remain healthy. Furthermore, a shift toward "slow water" approaches, which use wetlands, floodplains, and other natural features to reduce flood peaks, store water for droughts, and keep ecosystems healthy can support climate resilience, recreation opportunities, and clean water, in addition to benefiting ecosystems.[360]

Tier 2: Recommendations For Climate Resilience

The broad strategy to improve California's climate resilience will require a near complete overhaul of the current system of environmentally exploitative, fossil fuel–based capitalism. Without stopping climate change and the companies that extract and refine fossil fuels, no amount of adaptation can secure just outcomes for the most affected communities. In addition to stopping an extractive, fossil-fueled economy, we believe a focus on green infrastructure, returning land to Indigenous stewardship, and managing surface and groundwater as an interconnected system can best support a climate-

356 "National Water Dashboard," United States Geological Survey, accessed October 22, 2023, https://dashboard.waterdata.usgs.gov.

357 Lee et al., Updating California Water Laws to Address Drought and Climate Change.

358 Lee et al., Updating California Water Laws to Address Drought and Climate Change.

359 Craig M. Kauffman and Pamela L. Martin, "Can Rights of Nature Make Development More Sustainable? Why Some Ecuadorian Lawsuits Succeed and Others Fail," World Development 92 (April 2017): 130–42, https://doi.org/10.1016/j.worlddev.2016.11.017.

360 Erica Gies, "Slow Water — by Erica Gies," 2023, https://slowwater.world/.

resilient water system.

Our recommendations for resilience span across domestic, industrial, and environmental water uses. Therefore, we separate these recommendations only in terms of current implementation, incremental reforms, and systemic reforms.

CURRENT IMPLEMENTATION - CLIMATE RESILIENCE

California should leverage funding available through the IIJA and IRA to build climate-resilient and/or water-conserving infrastructure. The IIJA provides specific funding for water storage, infrastructure replacement, wastewater recycling and reuse, and water efficiency.[361] Water storage projects should prioritize underground storage and reuse because such storage increases water table height, allows storage across years to combat wet and dry extremes, dilutes pollutants in groundwater when done carefully, and reduces flood risks. Increased funding for State Revolving Funds can support additional projects like those for wastewater recycling facilities or water treatment in communities without it. In addition, the $4 billion for drought resilience in the IRA should prioritize long-term water conservation or resilience projects. Temporary water conservation, like paying farmers for temporary fallowing, can help alleviate short-term pressures, but does not reduce demand for water in the long term.

Some approaches to climate resilience, particularly drought mitigation, include strategies like diversifying supply portfolios by ensuring that water districts have multiple options and sources. Governments should begin by using data from the last decade and future climate projections, rather than historical flows, in planning their supplies.

As California is building these projects, the local availability of water and land will determine the most cost-effective and climate resilient options.

For example, in coastal cities with large wastewater streams and no downstream rivers, wastewater recycling may be the most cost effective and reliable source of water. In agricultural regions with large fields, groundwater recharge may prove most cost effective. In many cases, combinations of strategies provide the most economical and resilient water supply options.[362] Below, we outline key considerations for various types of climate resilience projects. All projects should be built with high-road labor practices that provide communities with economic benefits.

Managed aquifer recharge (MAR) is a promising "green infrastructure" approach for capturing and storing underground water during wet seasons, to be later accessed during dry periods.[363] This method can increase water availability outside of surface water resources and reduce flooding, as surface runoff is directed into aquifers instead. Groundwater recharge can also buffer coastal groundwater from seawater intrusion. Locations used for MAR often also provide a temporary habitat for migratory birds via a slowly draining pond.[364] However, increased MAR must not pollute groundwater by way of recharge in a contaminated land area, particularly properties used for dairy production.[365] For this reason, organic farms can be a promising location for MAR. If located and performed carefully, MAR can reduce groundwater

361 Stern and Normand, Bureau of Reclamation Provisions in the Infrastructure Investment and Jobs Act (P.L. 117-58).

362 Anke D. Leroux and Vance L. Martin, "Hedging Supply Risks: An Optimal Water Portfolio," American Journal of Agricultural Economics 98, no. 1 (2016): 276–96, https://doi.org/10.1093/ajae/aav014.

363 Maven, "Managed Aquifer Recharge in California," Maven's Notebook, August 29, 2018, https://mavensnotebook.com/2018/08/29/managed-aquifer-recharge-in-california/.

364 The Nature Conservancy, "BirdReturns: A Habitat Timeshare for Migratory Birds," The Nature Conservancy, August 9, 2022, https://www.nature.org/en-us/about-us/where-we-work/united-states/california/stories-in-california/migration-moneyball/.

365 Maven, "Managed Aquifer Recharge in California."

contamination levels of chemicals like pesticides.[366] Wastewater recycling from "toilet to tap" or "toilet to irrigation" is a promising resilience option. Wastewater treatment technology is currently able to produce safe water that is up to drinking water quality standards, but the public remains skeptical. A key challenge for successful water recycling is working with communities to ensure their involvement and comfort with these projects. "Toilet to irrigation" recycling requires extra piping to keep potable and non-potable water separate, and is therefore not always cost effective even though water treatment costs may be lower.

While they are important supply-side strategies, MAR and wastewater recycling are not a substitute for decreasing water withdrawals to match resource availability.[367] Demand management should be more flexible and efficient, with a particular emphasis on improving water management in the agricultural sector. Such flexibility will require growing sustainable crops, temporary fallowing in dry years, and providing other sources of revenue for farmers and income for workers through subsidies for things like renewable energy generation and payments for habitat restoration — while pairing such subsidies with high-road labor requirements. Cities can also reduce demand through short-term watering restrictions and programs to upgrade appliances, reduce turf, and more.

Desalination may be a promising water supply option in coastal, water-scarce areas, but it remains expensive and energy intensive.[368] Renewable energy sources should be used for both the construction and operation of any desalination or treatment plants.

We generally do not support new water diversions or conveyance, unless intended to address a historical wrong. Such gray infrastructure approaches damage ecosystems and can exacerbate water use patterns out of step with local climatic conditions.

INCREMENTAL REFORMS - CLIMATE RESILIENCE

California should aim to ensure the benefits of infrastructure and management systems without perpetuating the harm they have historically caused. To do this, we recommend additional funding for water management, as described above. Priority for "green" (natural) infrastructure such as bioswales, floodplains, and seagrass, rather than impervious "gray" (concrete-based) infrastructure will be helpful in reducing surface runoff and flooding and ensuring that groundwater recharge is maximized.[369] Efforts to identify, pilot, and scale green infrastructure should incentivize Indigenous-recommended technologies and partnerships that operate in accordance with traditional ecological knowledge (TEK). While we recommend "green" infrastructure approaches for new infrastructure wherever possible, updating some "green-gray" infrastructure like irrigation systems and "gray" infrastructure like aging municipal, stormwater, and wastewater systems will be vital to ensuring equitable water distribution.

To maximize the benefits of MAR, California passed laws in the summer of 2023 to allow for water diversions at times of imminent flooding risk until the end of 2028. While a good improvement, in practice this law's implementation should be monitored to ensure that drinking water users and underrepresented farmers are benefiting equitably

366 Fernandez-Bou et al., "Water, Environment, and Socioeconomic Justice in California."

367 Nicola Ulibarri et al., "Assessing the Feasibility of Managed Aquifer Recharge in California," Water Resources Research 57, no. 3 (2021): e2020WR029292, https://doi.org/10.1029/2020WR029292.

368 Khaled Elsaid et al., "Environmental Impact of Desalination Technologies: A Review," Science of The Total Environment 748 (December 2020): 141528, https://doi.org/10.1016/j.scitotenv.2020.141528.

369 Lyn Stoler and Sonam Velani, "Flipping the Script and Rebuilding for Resilience," Parachute on Substack (blog), October 6, 2022, https://parachuteearth.substack.com/p/street-note-3-flipping-the-script?utm_medium=email.

from newly available water diversions. The aim should be to extend this law permanently with any changes needed to enable equitable diversions.

SYSTEMIC REFORMS - CLIMATE RESILIENCE

Our recommendations build toward a vision of restoring land-based ways of life directed by Tribal leaders. Policies focused on water resource planning, which inherently intersect with land management, should build toward this vision with a focus on returning stolen land and Indigenous land stewardship. Restoration and rewilding will increase water storage capacity of entire hydrological systems, especially if focused on headwater areas. Reintroduction of species such as beavers can help to restore damaged ecosystems and provide more natural flood protection.

In addition to land restoration, new developments should be prohibited in high flood risk areas. Reliance on headwaters and the Bay Delta should be reduced through an emphasis on regional conservation efforts and water storage so that each watershed achieves sustainability within its own catchment area.

Dams and dam removal are often thorny issues because their history is tied to Indigenous displacement, disturbing Indigenous cultural practices, and environmental destruction. At the same time, dams provide meaningful benefits in the form of water storage, flood protection, and/or dispatchable clean energy generation. California's vision should include better water prioritization; deployment of zero-carbon energy like wind, solar, and storage; and increased investments in green infrastructure like aquifer recharge to maintain — or even improve upon — the benefits of dams, without relying on dams themselves. This will not be easy, and dam removals cannot occur immediately in many cases. However, the state must work toward future dam removal and the return of nearby and previously flooded land to Indigenous Peoples by recreating the benefits of dams through other technologies and infrastructure.

Cross-Cutting Recommendations For Essential Water Uses

All of the above strategies prioritizing Tier 1 and Tier 2 water use can be strengthened by greater state visibility into, and influence over, water resource management. California must incentivize and then require monitoring and reporting of water use. Transparency of all water diversions will be critical for allocating water in alignment with needs, managing flood flows, and maximizing underground water storage. As recommended by others,[370] California should fully fund monitoring and reporting efforts (mandated by SB 88 of 2015), as well as an SWRCB pilot program to determine the feasibility of real-time monitoring, reporting, and diverting of surface water in at least two watersheds. The SWRCB should publish a report that shares learnings and recommends a pathway to making real-time water diversion decisions in all watersheds.[371]

California could also authorize the SWRCB to enforce and curtail all water rights, inclusive of pre-1914 claims.[372] At the same time, ending "use or lose" water rights can help provide more junior water rights holders with water during dry years. The SWRCB should also tighten and enforce stricter standards of what constitutes "reasonable" water use, to ensure that people are not maximizing profits

370 Lee et al., Updating California Water Laws to Address Drought and Climate Change.

371 Lee et al., Updating California Water Laws to Address Drought and Climate Change.

372 Ellen Hanak, Brian Gray, and Jeffrey Mount, "Testimony: Adapting California's Water Rights System to the 21st-Century Climate," Public Policy Institute of California (blog), February 28, 2023, https://www.ppic.org/blog/testimony-adapting-californias-water-rights-system-to-the-21st-century-climate/.

at the expense of basic needs for water.

Legislatively, we would like to see California increase state management of water by taxing some water currently allocated by rights and redistributing the water itself based on highest societal value, buying water rights outright, or placing expiry dates on water rights or limiting their ability to be passed down generationally. Other creative legislative mechanisms to put more water in state control, as opposed to individual or institutional control, should also be examined.

Tier 3: Recommendations for reducing private luxury uses

Private luxury water uses are resource-intensive and polluting, while often advancing private economic interests. We believe that such uses must be reduced, and only allowed if they are nonpolluting and Tier 1 and Tier 2 needs are already met. Domestic water uses in this category may include watering private lawns and ornamental (rather than food) gardens. Industrial uses in this category include unsustainable crops and extraction and refining of fossil fuels. Environmental uses in this tier include golf courses.

We believe that prioritizing Tier 1 and Tier 2 water uses will inherently move water away from Tier 3 uses. Thus, all Tier 1 and Tier 2 recommendations should be considered a component of our strategy for reducing Tier 3 water uses. In this section, we add a few additional recommendations specifically aimed at reducing private luxury uses.

REDUCING DOMESTIC WATER USE

Among domestic uses, we refer back to our recommendation to repeal or reform Prop 26 and Prop 218, which together require providing water based on utility cost. Instead, California should pursue a policy of providing free water at minimum thresholds, and then increasing rates to appropriately reflect excess water uses. Such sharply progressive rates will disincentivize water-intensive lawns and gardens. California should also move toward banning new nonfunctional turf, something Las Vegas has done, and instead require native plants in most landscaping. Many cities in California, like Los Angeles, already give incentives to replace nonfunctional turf with drought-resistant native vegetation.[373] The state and localities should expand these programs to include direct installation instead of only providing rebate programs (which are harder for working-class customers to access), and provide technical assistance to ensure high uptake. After providing incentives for a period, localities should begin requiring turf conversions, with financial assistance for lower-income homeowners who cannot afford the upfront costs, and preservation of grassy areas used as community gathering spaces — like some lawns in front of schools or churches. Finally, such a program should be paired with renewed investments in public luxuries like parks and public fields for playing sports and passing time on pleasant days. This approach is intended to increase the vitality and usability of parks as a public good.

REDUCING INDUSTRIAL WATER USE

In industrial agriculture, California should take a number of steps to move agriculture in a more sustainable direction through incentive programs, as detailed above. In addition to support for more sustainable agriculture, new laws must increase accountability, transparency, and responsibility of industrial water users. In this vein, we support AB 1563, which would require GSAs to consider the impact of drilling new agricultural wells on

373 Los Angeles Department of Water and Power, "Rebate Increase Gives LADWP Customers $5 per Square Foot to Replace Lawns with Sustainable Landscaping," news release, November 3, 2022, https://www.ladwpnews.com/rebate-increase-gives-ladwp-customers-5-per-square-foot-to-replace-lawns-with-sustainable-landscaping/.

domestic well users. The state should go further and pass extended producer responsibility (EPR) bills that require agricultural and materials production industries to take responsibility for the products or pollution created by their processes or their groundwater overpumping on all domestic and environmental water. These EPR bills clarify that industries that pollute local water supplies, as many have in Los Angeles and in the Central Valley, must pay for the cleanup and provision of adequate, clean water to affected communities. In this way, these laws will work in tandem with increasing water quality standards described in incremental reforms for Tier 1 industrial water uses. Furthermore, industries should be required to disclose their water use. Such transparency and accountability laws also create financial and reputational incentives for industries to not pollute or overpump in the first place[374] and provide advocates with data to call for change if industries do harm others' water access.

Should the combination of policies listed above (along with recommendations for Tier 1 and Tier 2) prove insufficient to secure water for vulnerable communities, California should study taking more direct approaches. For example, the state should examine using eminent domain to stop and prevent the most egregiously polluting or wasteful industrial agricultural practices with high societal costs,[375] specifying certain practices as no longer being "beneficial uses" of water, eliminating the crop insurance market for unsustainable agriculture, or banning export of crops from particularly extractive production systems to cut off their market access. Direct approaches like these may come with unintended consequences. Therefore, we strongly urge that lawmakers work alongside movements and community groups when developing such approaches to minimize unintended outcomes. Reducing the growth of water-intensive crops should help keep prime farmland in production, and can help shift land use and labor in ways that provide for more high-road labor.

Heavy and extractive industries also threaten California's water supplies. For example, companies in the Los Angeles region, which already imports water from all over California and the Colorado River, use water for fracking, an industry we should end with all possible haste to prevent the worst effects of climate change. Fracking and oil refining operations also require large amounts of water. In California, these fossil fuel companies do not need to disclose their water use to the public, so the exact volumes are unknown.[376] Replacing the fossil fuel economy with solar, wind, and energy storage can reduce water use in industry and redirect water for meeting Tier 1 and Tier 2 needs. As these energy transitions take place, high-road labor strategies can help ensure a just transition for fossil fuel workers.[377]

Finally, while some industries should be phased out entirely, others may play important roles in a sustainable future, like battery recycling and computer chip manufacturing. Such industries will reduce water-intensive mining and burning of fossil fuels, and can mitigate climate change. State and federal incentives for these industries should support research and development (R&D) for less water-intensive processes, recycling, and ensuring clean wastewater streams that remain usable for human consumption, agriculture, and the environment. R&D tax credits and extended producer responsibility laws can support these efforts. Finally, when high-volume water users take water from the community,

374 Zoom interview with Michael Rincon, Physicians for Social Responsibility-Los Angeles, April 1, 2023.

375 Zoom interview with Mai Nguyen of the California Grain Campaign and Minnow, August 2, 2023.

376 Zoom interview with Michael Rincon, Physicians for Social Responsibility-Los Angeles, April 1, 2023.

377 Bigger and Strecker, Primer: Green Industrial Strategy for Just Transitions.

this extraction must be limited such that basic needs within the community are met first. Financial benefits that high-volume water users gain must be shared with the community through a high-road economic development approach.

REDUCING ENVIRONMENTAL WATER USE

Finally, human-made aesthetic landscapes also threaten California's water resources. California recently passed AB 1572,[378] which bans the use of drinking water (but not recycled water) to irrigate nonfunctional turf starting in 2027.[379] California should build on this law to ban all irrigation of nonfunctional turf, given the opportunity to recycle water for drinking water purposes. For example, Los Angeles plans to recycle 100 percent of its wastewater by 2035.[380] Furthermore, certain forms of private leisure should have lower priority for water use. Golf courses are a perfect example. Their owners accumulate wealth, but only a few wealthy people enjoy the course while irrigating the course depletes water resources for the broader public. We recommend that golf courses either go without irrigation or face similar extended producer responsibility laws that we recommend for industrial agriculture, manufacturing, and processing such that the courses are responsible for paying for infrastructure upgrades or water for nearby communities without reliable and affordable access. Should such policies prove insufficient, California should consider a ban on irrigating golf courses, building on lessons learned in passing AB 1572 in 2023.[381]

378 Maggie Angst, "Gavin Newsom Signs Law to Permanently Ban Watering Grass at Certain California Businesses," The Sacramento Bee, October 14, 2023, https://www.sacbee.com/news/politics-government/capitol-alert/article279832529.html.

379 Ian James, "California Is Moving to Outlaw Watering Some Grass That's Purely Decorative," Los Angeles Times, September 13, 2023, sec. Climate & Environment, https://www.latimes.com/environment/story/2023-09-13/california-legislators-target-nonfunctional-grass.

380 Los Angeles Department of Water and Power, "Mayor Garcetti: Los Angeles Will Recycle 100% of City's Wastewater by 2035," news release, February 21, 2019, https://www.ladwpnews.com/mayor-garecetti-los-angeles-will-recycle-100-of-citys-wastewater-by-2035/.

381 "Potable water: nonfunctional turf," Pub. L. No. AB 1572, 10540, 10608.12, 10608.22, 110 Water Code (2023). https://legiscan.com/CA/bill/AB1572/2023.

5.
Conclusion: Strategies for Achieving Water Justice in California

Dismantling a 100-plus-year-old water rights system that entrenches power and facilitates unbalanced wealth accumulation will be a challenging, multiyear to multi-decade effort. We conclude by highlighting different pathways for the reforms discussed above, based on existing efforts. We also aim to show how political, organizing, and legal strategies can reinforce and strengthen one another.

Political Strategies

Wholesale reform of water rights will likely occur over time, with partial victories along the way. These intermediate steps can allow organizers to build coalitions needed to achieve larger reforms, win immediate and meaningful improvements in people's lives that strengthen the movement, and give lawsuits increasing leverage to drive reforms. Some intermediate policies outlined in our recommendations for making water allocations more fair and improving people's lives include allowing for progressive water rates, providing financial assistance for sustainable agriculture and "green" infrastructure, increasing Tribal management of land, and supporting for democratic water governance.

Legislation that alters the fundamental inequity and uneven power dynamics of the existing water rights system is especially important. For example, the state could buy water rights from their holders, prohibit water rights from being passed down from one generation to the next, levy a tax on the most senior water rights holders so that a percentage of their water allocation provides for essential uses, require senior water rights holders to prove validity of pre-1914 water rights (as was recently enacted),[382] or require reporting and verification of beneficial use of water.[383] In addition to reducing the volume of water controlled through the archaic rights system, California's legislature could also more strictly define beneficial use of water to limit uses this report defines as nonessential. These approaches would, over time, reduce the amount of water — and the associated power — allocated based on an archaic system.

382 "SB-389 State Water Resources Control Board: Investigation of Water Right," Water § 1051 (n.d.), 389, California Legislative Information, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240SB389.

383 Lee et al., Updating California Water Laws to Address Drought and Climate Change.

Organizing strategies

The Gulf South for a Green New Deal slogan created a bigger umbrella under which existing organizing work, led for decades by local communities, could be understood as part of the same fight for climate, environmental, and economic justice in the region. We hope a vision of water justice, underpinned by achieving the HR2W, sustainable agriculture, and a vibrant environment brought about through needs-based prioritization of water and governance mechanisms that shift power dynamics might provide a similar umbrella for existing organizers to highlight that their efforts are part of a broader, unified effort. Many organizations, such as PolicyLink, Leadership Counsel for Accountability and Justice, Los Angeles Alliance for a New Economy, and the Community Water Center, already work together toward common goals. Their campaigns focus on a wide range of issues relevant to a local area (affordability, no water shutoffs, investment in domestic wells and small water systems, etc.).

Through such campaigns, organizers can work toward intermediate steps that make meaningful improvements in the lives of their communities at the state and local level. These intermediate steps can build momentum for bigger steps, and prove that prioritizing water based on societal value can work on a smaller scale. For example, the Adelanto Water Justice Coalition released a report outlining recommendations to the city, including a community water board. Ojai FLOW (Friends for Locally Owned Water) won a campaign to make their water utility public.[384] Other organizers might pass community-based governance models within their GSA boundaries, or identify movement-supporting lawyers to bring lawsuits that highlight and reverse a senior water rights holder using water unreasonably

384 Jean Yamamura, "Ojai Rejects Private Water Company," Santa Barbara Independent, July 18, 2018, https://www.independent.com/2018/07/18/ojai-rejects-private-water-company/.

at the expensive of people's basic needs (as described in the legal strategies section below). Such incremental steps can both bring tangible improvements to people's lives and build momentum for a larger reimagining of the current system.

In that sense, we hope this vision unites various groups organizing for justice — social, racial, environmental, climate, intergenerational, Tribal, and others. When organizers use their combined power as voters, organizers, and media subjects, they can more effectively pressure politicians to support an expansive vision of water justice. Organizers should consider using all tactics: asking for support, requesting a politician's stance on this issue before committing resources to their election, shaming them to increase the salience of this issue with the public, and disruptive civil disobedience. Such escalating tactics are already working to push water quality and quantity issues onto the agenda of the California Democratic Party and can lead to additional positive legislative changes to realize that vision.

Legal Strategies

Courts can also provide important mechanisms to allocate water more fairly. California's legal code, Section 878.1 of the State Water Resources Control Board's regulations, states that water uses for "minimum human health and safety needs" can take priority over junior and senior water rights.[385] Furthermore, the California constitution (Article X, Section 2) requires that all water rights be exercised reasonably, meaning that if a particular use of water is "unreasonable" under current circumstances, then courts do not have to honor the senior water rights priority allocation.[386]

We recognize that legal avenues face equity challenges, since those bringing a lawsuit must pay for attorneys and prove unreasonable use by corporations or wealthy landowners. This is especially true when communities with the strongest claims, like those whose wells have gone dry or have been contaminated due to overpumping by others, are low-income and have little access to the legal system.[387] Despite these equity challenges, strategic lawsuits can build further scaffolding for prioritizing water based on societal value. In several curtailment orders issued during the last drought, the SWRCB altered the water rights hierarchy to ensure minimum human health and safety needs, demonstrating the promise and power of the state to do so in the future.[388] This suggests that the legal system may be a potentially strong avenue for changing normal water rights priorities, especially if water rights violate essential human uses.[389] Lawsuits that highlight the impingement of the HR2W could redistribute water within their scope toward basic needs and make future actors think twice about actions that deplete water at others' expense. Similarly, the Public Trust Doctrine has been leveraged increasingly since the 1970s to ensure private water withdrawals do not deplete environmental flows. This led to the 2009 Delta Reform Act embedding policy and planning with the concept of "coequal goals" for "providing a more reliable water supply for California and protecting, restoring, and enhancing the Bay Delta

385 "Cal. Code Regs. Tit. 23, § 878.1 - Minimum Human Health and Safety Needs," Title 23 - Waters § Article 24, Section 878.1 (n.d.), https://www.law.cornell.edu/regulations/california/23-CCR-878.1.

386 "ARTICLE X WATER [SECTION 1 - SEC. 7] CALIFORNIA CONSTITUTION," https://law.justia.com/constitution/california/article-x/.

387 Zoom Interview with Brian Gray, Professor of Law Emeritus, University of California, March 15, 2023.

388 Brian E. Gray, "Chapter 4. The Reasonable Use Doctrine in California Water Law and Policy," in Sustainable Water (Berkeley, CA: University of California Press, 2019), 83–107, https://doi.org/10.1525/9780520960879-007.

389 Zoom Interview with Brian Gray, Professor of Law Emeritus, University of California, March 15, 2023.

ecosystem."[390] As a result, the SWRCB adopted flow criteria in 2010[391] to protect Public Trust resources in the Bay Delta.[392]

In addition to catalyzing immediate improved outcomes, lawsuits can also help build political and organizing support. For example, the Environmental Law Clinic at Stanford brought a petition for rulemaking to revise Bay Delta water quality standards on behalf of the Winnemem Wintu Tribe, Shingle Springs Band of Miwok Indians, Little Manila Rising, and Restore the Delta.[393] This lawsuit called into question the exemption of pre-1914 water rights from state regulation based on their roots in discrimination, exclusion, and violence; the state's legal role as steward of all water resources; and the harms that will accumulate to watersheds, Tribes, and communities of color without management and restructuring of water rights.[394] Although the SWRCB denied the petition, the EPA is now reviewing it,[395] and its mere existence increases public knowledge, scrutiny, and outrage about the archaic and racist water rights system. This knowledge creates more fertile ground for organizers and increases public pressure on lawmakers to change the inequitable status quo of California's water rights.

When considering the racist nature of California's water rights, the growing threat from climate change, capitalist motives that extract and exploit water and workers in agriculture, and diminishing ecosystem health, it is clear that the status quo cannot continue. As the state changes its water management regimes, those alterations must shift the power structures that led to today's unsustainable model and prioritize water for household use, Tribal culture and subsistence, sustainable agriculture, and ecosystem health. Movements, advocates, legal scholars, and the general public all have a role to play. Dreaming big and pursuing a just water future through overlapping and reinforcing political, organizing, and legal strategies can turn that vision into reality.

390 Quinn, Forty Years of California Water Policy: What Worked, What Didn't, and Lessons for the Future.

391 Planning and Conservation League, "State Water Resources Control Board Adopts Delta Flow Criteria," media release, August 6, 2010, https://www.pcl.org/2010/08/state-water-resources-control-board-adopts-delta-flow-criteria/.

392 "Final Report on Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem," Delta Flow Criteria, State Water Resources Control Board," accessed April 4, 2023, https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/final_rpt.shtml.

393 Stanford Environmental Law Clinic, "ELC Supports Efforts by Tribes and Environmental Justice Advocates to Reframe California Water Rights," Stanford Law School (blog), March 16, 2022, https://law.stanford.edu/2022/03/16/elc-supports-efforts-by-tribes-and-environmental-justice-advocates-to-reframe-california-water-rights/.

394 Stanford Environmental Law Clinic, "ELC Supports Efforts by Tribes and Environmental Justice Advocates to Reframe California Water Rights."

395 Anhthu Hoang, "Acceptance of Administrative Complaint," Letter to Eileen Sobeck, Executive Director, California State Water Resources Control Board, August 8, 2023, https://www.restorethedelta.org/wp-content/uploads/2023.08.08-REC_Acceptance_01RNO-23-R9.pdf.