

POSSIBILITY LAB
UNIVERSITY OF CALIFORNIA BERKELEY
Abundance Accelerator

Water Abundance for California

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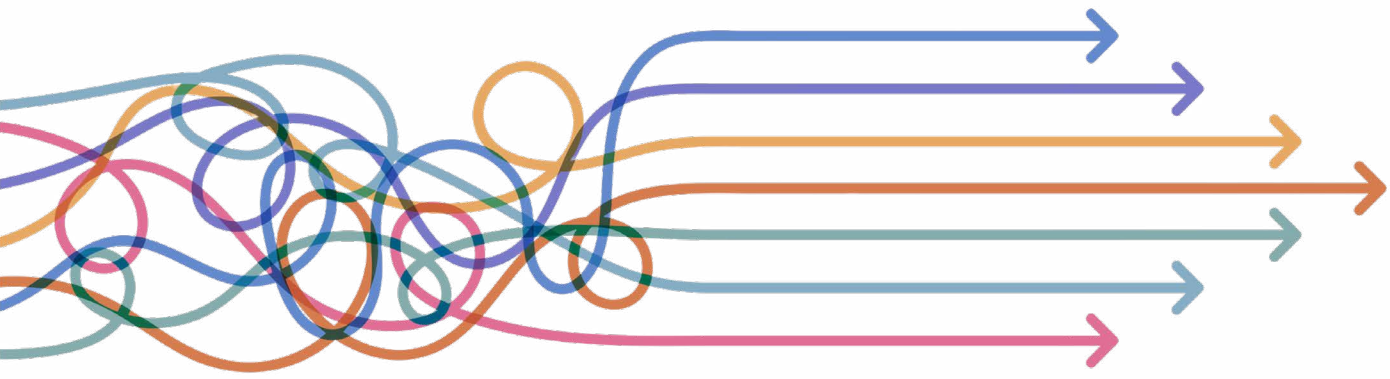
Abundance Accelerator

About the Abundance Policy Research Consortium

In the summer of 2024, the UC Berkeley Possibility Lab invited researchers and experts from across California to develop an evidence-based, fundamentals-first policy agenda for expanding access to 12 human essentials, including: housing, transportation, energy, food, water, safety, education, employment, digital connectivity, healthcare, childcare, and eldercare. The Consortium operates within the Possibility Lab's Abundance Accelerator, which focuses on a holistic vision of supply-side policymaking that builds with people, not just for them.

About the Abundance Policy Report Series

This paper is one of 12 reports being released in 2026 as part of the Abundance Policy Report Series, commissioned and edited by the Possibility Lab's Abundance Accelerator. For this series, each member of the Consortium produced a research report that analyzes their policy domain's existing context in California, identifies the root causes creating their policy area's scarcities, proposes policy levers to improve supply, and discusses potential challenges for implementation.



About the Possibility Lab's People-Centered Approach to Abundance

In California and across the country, we've seen growing support for the abundance agenda. However, as the movement gains momentum, deeper tensions have surfaced around how to balance growth and efficiency with equity and justice. In response, the Possibility Lab has used this dialogue to refine its vision for people-centered policymaking in California, reimagining not just what we build, but who builds it, who benefits, and how power is distributed in the process.

As part of the report series, each Consortium member analyzed their essential policy area across the Pillars, Principles, and Practices that comprise the Lab's framework for "People-Centered Abundance." In their respective reports, each member of the Consortium critically engages with the Pillars, Principles, and Practices, assessing which are most relevant for policymaking in their field and which are less applicable. The intent of this exercise is to bridge otherwise disconnected policy domains and bring them into the same conversation, with the ultimate goal of building a cohesive policy agenda for an abundant California.

The people-centered abundance framework has nine tenets, organized into three Pillars, three Principles, and three Practices. The Pillars reflect core ideas of the abundance agenda, such as increasing the supply of essential goods and focusing on policy outcomes. The Principles highlight the values and priorities that inform the Possibility Lab's unique perspective on creating abundance that is shared by all people. The Practices characterize the Lab's recommended approach to achieving abundance, which involves confronting tradeoffs and working in partnerships to strengthen our civic infrastructure and make data-driven policy decisions.

DISCLAIMER

The contents of this report and others in the Abundance Policy Report Series reflect only the views of the author(s), who is solely responsible for the content and accuracy of the information presented herein. This document is disseminated under the sponsorship of the UC Berkeley Possibility Lab and its Abundance Accelerator for the purpose and in the interest of information exchange. The content does not necessarily reflect the views or policies of UC Berkeley's Possibility Lab, other partners of the Abundance Accelerator or authors in the Policy Report Series, the California Community Foundation and its Donors, or the University of California.

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Executive Summary

Supply-Side Policy has long dominated California's discussion and decision-making around water rights and use. While this has resulted in a scenario where the vast majority of residents and economic activities in the state have abundant water, the supply-side focus has two major dark spots. First, over 1 million Californians lack enough clean, affordable water to meet their daily subsistence needs. Second, the vast infrastructure we've built to secure a reliable water supply has drained natural ecosystems – our rivers, lakes, and aquifers – and the many vital species they support.

This position paper reflects on the path to building a truly water-abundant California, where every resident has enough clean, affordable water for drinking, cooking, and bathing, with water that is sourced to ensure healthy ecosystems for generations to come. This will require shifting mindsets to (1) recognize that water availability in California is temporally variable, with both very wet and very dry years, rather than inherently scarce, and (2) that most people and sectors already have enough. It will also require updates across legal, regulatory, and administrative systems to better align with abundance pillars, principles, and practices.

Low hanging fruits include programmatic permits to allow for more widespread development of water recycling, funding and capacity-building for small water systems that struggle to meet water quality standards, and managing our forests to promote healthy native ecosystems. On a deeper level, true abundance will require tackling two long-held practices in California water policy. First, our system of prior appropriation is fundamentally at odds with equitable water distribution. Second, the state legislature often defers implementation to local governments with minimal penalties for noncompliance, which has hampered the impact of numerous well-meaning laws, including the Human Right to Water Law and the Sustainable Groundwater Management Act.

Introduction

As a policy agenda, abundance focuses on the ability of people to access essential resources by enhancing their supply. Prominent proponents of abundance like Ezra Klein and Derek Thompson focus on the "failures" of liberal government, arguing that regulations designed to protect subsets of the environment and society artificially restrict the supply of essential resources by blocking their development, and that by removing or streamlining these regulations we could make resources more readily available (Klein & Thompson, 2025). However, this so-called liberal view of abundance risks harming the many people and environments these regulations aim to protect (Teles, 2025). To chart an alternative path, the Abundance Accelerator is developing a more inclusive, human-centered view of abundance, asking how we might build a "politics of plenty" that meets the needs of diverse Californians.

This position paper introduces an abundance agenda for California water. Water is a unique resource compared to the other policy areas considered in these papers. Humans cannot survive without water for more than a few days, making it a very elemental need. In addition, water is an inherently limited resource. The total amount of water available on the planet is fixed; while people can move water around, we cannot create more water. The same cannot be said about food, housing, safety, energy, etc. Finally, because it is a product of natural forces and cannot be created by humans, water is only available to collect in particular times and places.

This position paper first introduces the history of water management in California and diagnoses the current status of water availability in the state, both good and bad. It then discusses the applicability of the Abundance Accelerator's Pillars, Principles, and Practices and how to better apply them in the path toward water abundance.

California Policy Context: Water as a Case Study in Supply-Side Policy Dominance

Californians often hear the refrain that we live in a state where water is scarce. However, the reality is that water is less scarce than it is variable. While some parts of the state receive the lowest amount of precipitation in the country (Mojave Desert, San Joaquin Valley), others, like the North Coast and parts of the Sierra Nevada, get as much precipitation on average as the wettest parts of the United States. What makes California even more unique is how much our precipitation varies year to year. Across the state, we experience very dry years and very wet years, with relatively few "average" years (Dettinger et al., 2011).

Because of this variability, California has long focused on Supply-Side Policies to ensure that water is available when and where it is needed. Since the early 1900s, local, state, and federal water utilities have developed a massive infrastructure that moves water across the state, supplying our farms, cities, and industries (Hanak et al., 2011). These systems and projects capture water in wet years and store it for dry years and move water from wet parts of the state to the most populous and agriculturally productive places. Even more recent policies like the Sustainable Groundwater Management Act prominently feature supply-side infrastructure development, rather than focusing on reducing demand (Jezdimirovic et al., 2020; Ulibarri et al., 2021).

California's vast infrastructure, generated by a supply-side mentality, means that water is readily available for most Californians today. 95% of the state's population and 90% of its economy are supported by just 20% of the water used by humans (Lund et al., 2024). Most readers of this position paper will never experience turning on a tap and not reliably having water come out—this is because your water is abundant.

In other words, California has long had a Supply-Side Focus, and this focus has resulted in a California where most of the population has plenty of clean water to support their daily activities and an economy that is among the strongest in the world. We've succeeded in building macro-scale water abundance here in California.

The Downside of Supply-Side Policies: Equity and the Environment

Despite California's macro-scale water abundance, our supply-side focus has resulted in two prominent drawbacks. First, approximately one million Californians still lack reliable, clean, affordable water. Second, building our water supply has come at the expense of our natural waterways and the habitats they support.

Problem 1: Equity

Water is not abundant for three main groups of Californians. First, people who rely on domestic wells in groundwater-dependent areas, especially in the San Joaquin Valley and parts of the Central Coast, face the risk of their wells running dry. During every drought, thousands of Californians report their wells have run dry (State of California, 2025), and households must rely on tankers for domestic use. Even in relatively wet years, some wells still run dry because the area around them has been overpumped (Bland, 2025). And the problem will likely worsen. Implementing the minimum thresholds proposed by Groundwater Sustainability Agencies (GSA) will result in over 10,000 domestic and public wells being dewatered across the Central Valley (Bostic et al., 2023); this optimistic scenario assumes GSAs will be successful in meeting their target thresholds by 2040.

The second group of people lack access to safe, uncontaminated drinking water from their water utility or from a well. Across the state, but primarily in rural parts of the Central Valley and Inland Deserts, almost one million Californians receive water that doesn't meet Safe Drinking Water Act standards (California Drinking Water Systems Out of Compliance, n.d.).

Finally, some Californians have access to safe drinking water, but rising costs are making water unaffordable. In many parts of California, water prices are increasing faster than inflation (Chappelle & Hanak, 2021). Smaller water supply systems are particularly at risk, because their infrastructure maintenance and water cleaning costs are higher; these costs are passed on to the consumer.

Problem 2: Environment

California's historic focus on facilitating water supply through large grey infrastructure has completely transformed our state's natural habitat. This conversion is the result of both removing water from where it would naturally be and from the infrastructure itself.

Perhaps the most famous example of the negative impacts of removing water from rivers or lakes is the Owens Valley. After the Los Angeles Department of Water and Power built the Los Angeles Aqueduct to carry water 419 miles from the Owens Valley to Los Angeles, they

drained Owens Lake and destroyed the livelihood of the farmers that lived nearby (Hanak et al., 2011). Today, Owens Valley has some of the worst air quality in the country due to persistent severe dust storms—from dust generated by the dried-out lakebed (National Academies of Sciences, Engineering, and Medicine et al., 2020). Removing water also has substantial impacts on water quality. Freshwater dilutes contamination that enters rivers; with less water in the river, the concentration of pollution is higher.

Over 1,400 dams have been built across the state. This extensive infrastructure has disrupted the natural flow of almost all our rivers, altering the river's temperature, water quality, and amount of sediment (Lintern et al., 2018; Patil et al., 2022). Indeed, the substantial coastal erosion in many parts of the state is partly because sediment-starved rivers haven't been supplying the coast with enough dirt to maintain robust shorelines (Andrews & Antweiler, 2012; Slagel & Griggs, 2008). Because dams also prevent flood flows, plant species that need floodwaters to germinate their seeds have also seen their natural reproduction impacted (Gordon & Meentemeyer, 2006). The lack of flood flows also limits habitat for juveniles of many fish species. Finally, dams also block fish from migrating up the full length of a river. These combined impacts have led to major declines in many culturally and economically important fish like salmon and steelhead. As of 2021, 32% of native fish species in California are endangered, and 7% are extinct (Leidy & Moyle, 2021).

Pumping groundwater also produces substantial environmental impacts. In places where groundwater is close to the surface, lowering the groundwater table disrupts groundwater-surface water connections, potentially resulting in less surface water (Conant et al., 2019). In places with clay soil, pumping groundwater can result in land subsidence, where the clay permanently compacts when it is dewatered. In parts of the Central Valley and Central and South Coasts, this has led to permanent loss of potential groundwater storage and damaged infrastructure on the surface (Faunt et al., 2015; Miller et al., 2020). Finally, where groundwater is pumped near the ocean, overpumping can result in saltwater intrusion when salt water mixes with the fresh groundwater, making it temporarily or permanently unusable for agriculture or other human uses (Kim et al., 2025).

Defining Water Abundance for California

In a truly water-abundant California, every Californian has enough clean, affordable water for drinking, cooking, and bathing, with water that is sourced to ensure healthy ecosystems for generations to come.

Abundance Pillars, Principles, and Practices

The remainder of this position paper engages with the Possibility Lab's abundance pillars, principles, and practices, reflecting on the current status of each theme and identifying needed measures to achieve water abundance.

Pillar 1: Encourage an Abundance Mindset

The state of California would benefit from a shift in mindset, but not toward wholesale 'abundance' that more water is always better. Continuing to build out a new water supply will simply result in excess and further environmental destruction. Instead, the needed mindset recognizes that water in California is variable, rather than scarce (as described earlier), and that most Californians have enough water. To counter the widespread feeling of scarcity, it is necessary to challenge dominant narratives—not just at the policy level but also via personal experience. Such tactics would encourage people to reflect on their lived experience with water—e.g., have they ever had a tap run dry or been unable to afford their bills, even in times of drought. Most people would realize they've never directly experienced a shortage. At the same time, this narrative shift would spotlight the million Californians for whom the answer to that reflection is yes and thereby focus our lens on equity. Educational campaigns for journalists, policymakers, and teachers about the realities of California's water availability presents another avenue, given that these individuals shape so much of the discourse about water held by everyday residents.

Pillar 2: Create Enough to Meet Everyone's Needs

Because of California's historic focus on building a robust water supply, we have enough water to meet the basic drinking, cooking, and sanitary needs of all Californians. The problem is that we do not distribute that water equally to all households (see Principle 2, below). Moving beyond basic household uses and into the water needs of industrial sectors raises a second challenge, namely delineating the definition of "enough" and who sets its terms. There is a widespread perception that California's agricultural sector uses more than its fair share of water (e.g., C-WIN, 2025; Mercier, 2025). But the sector itself maintains that it has adopted widespread efficiency standards and requires irrigated water to provide food (Gunasekara, 2023). California is also seeing an increase in other water-intensive industries like data centers. Determining which sectors are 'worthy' of water and what societal value they confer is a complicated, messy problem that will always leave some parties unsatisfied with an answer. For this reason, this paper focuses on abundance at the household level.

Pillar 3: Design Systems to Deliver

A major barrier to any reform of California's water system is water law, specifically California's use of prior appropriation to allocate water rights. In California, water rights are allocated according to a first-in-time, first-in-right principle that prioritizes those who have been around longer. These 'senior' water rights holders are mostly large agricultural users and a few large older cities like San Francisco. As a consequence, if there is not enough water to fulfill all water rights, shortages apply only to junior users. Moreover, any users who already had established water rights in 1914, when the current system was created, were grandfathered in with a 'riparian' right, which allows them to use whatever water flows on their property, provided the use is reasonable. Both riparian and senior appropriative water rights holders have substantial bargaining power because any effort to reallocate water or encourage them to use less could be viewed legally as taking their property. This has made reforming allocation of water rights a political third-rail that politicians and agencies are unwilling to address. Prior appropriation essentially makes it impossible to allocate water equitably.

Our current regulatory and financing systems may demand revision as the state begins to update existing infrastructure. Cities across California have aging water infrastructure. For instance, 25% of water mains in San Francisco and Los Angeles are over 90 years old, much of the state's stormwater drainage infrastructure was built before 1940, and 70% of its dams are over 50 years old. Updating these systems will cost hundreds of billions of dollars (California Infrastructure Report Card, 2018), but these adjustments are necessary to maintain our current water supply. Financing for large infrastructure projects traditionally comes from state bonds, while utilities account for ongoing maintenance and upgrades by raising water rates (which negatively impacts affordability). Infrastructure upgrades will likely proceed incrementally, but advance planning can help ensure timely distribution of available funding across the state. There are also opportunities to streamline required permitting and environmental reviews, though such efforts should strive to maintain the same level of environmental or social protections while reducing the time, staffing, or resources necessary to complete these processes (Ulibarri et al., 2017). One promising approach is programmatic permits, which specify requirements for particular classes of projects; the programmatic permit is subject to the full review, and specific projects that meet those requirements are automatically approved thereafter (Goodrich et al., 2023).

Principle 1: Put People at the Center of Abundance

Training the next generation of the water workforce is critical to ensuring abundance. The water sector's aging workforce means that utilities are struggling to replace retiring baby boomers with skilled new workers. In California, about 40% of water workers are likely to retire in the next decade. We will need to significantly grow the number of workers to implement needed infrastructure repairs over the next few decades (discussed above in Principle 8) (A Reliable Workforce for Reliable Water Infrastructure, 2024). This labor challenge is multi-facet-

ed, resulting from a mix of shifting demographics, organizational cultures that are reluctant to adopt new practices, and the highly technical and specialized nature of water work. Moreover, public utilities provide relatively low salaries given the training required, meaning many skilled workers opt to work in sectors like consulting at much higher wages.

While the federal government and water associations have focused on the water workforce crisis for almost three decades, the worker shortage persists, which makes suggesting key interventions a challenge. Nevertheless, there is diverse guidance about policies and programs California could adopt, from developing training programs with community colleges (and ensuring sufficient teaching staff for instruction), to engaging in strategic workforce planning, and raising public awareness about the sector's job opportunities (California Workforce Needs in the Water/Wastewater Industry, 2023, Compendium of Successful Water Workforce Practices, 2021, Toward a Strong and Equitable Water Workforce, 2024).

Another way to position people at the center of abundance would require water utilities to more meaningfully consider the actual humans who are receiving the water they deliver. Water agencies and utilities usually focus on the technical dimensions of supplying water. A study of California water management plans found that less than half discussed the social impacts of the water they supply, and none included details about specific characteristics of the people being served (like income levels or health needs) (Escobedo Garcia & Ulibarri, 2023). Integrating these components into management plans would help utilities understand the distinct needs of the different communities they serve.

Principle 2: Ensure Equitable Access to Goods and Services

Equity is critical to building a holistically water-abundant California. Notable pockets of the state still do not have enough clean, affordable water for drinking, bathing, and cooking. Historically, the groups living in these areas have been excluded from or overlooked by the state's large-scale infrastructure development; assuming that a 'trickle down' effect would help them in the future is both naïve and misguided. Targeted infrastructure, regulation, and financing to address these disparities can help these groups receive abundant water.

As an attempt to remedy inequities in access, in 2012 the legislature passed the Human Right to Water Law (AB 685), making California the first state to recognize water access as a fundamental human right. The bill asserts that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." But the bill is largely symbolic—it contains no specific implementation actions and absolves local water districts of any responsibility for violations of the law (Gomberg, 2023). The state has begun mapping the quality, accessibility, and affordability of water in response to AB 685 (Balazs et al., 2021), but it is unclear whether forward progress is being made.

Updating the Human Right to Water Law to include actionable steps could mean adding specific metrics for monitoring progress on fulfilling this human right and providing funding

and training to under-performing water utilities. However, truly achieving equity will require addressing the systemic problems that draw water away from groups that do not receive it: reforming water rights (Pillar 3), regulating groundwater overpumping, and ensuring that rural water utilities have enough financing (which is typically dependent on local tax revenue) to provide clean drinking water.

Principle 3: Equip the Government to Serve the People

State capacity is not a significant problem for California's water sector. The state has invested in a number of important new initiatives, such as water data sharing through the Open and Transparent Water Data Act, and has significant technical expertise in both the State Water Resources Control Board and the Department of Water Resources. Going forward, maintaining that expertise will require continuing to invest in the state water workforce, especially by providing sufficient pay.

Practice 1: Maximize Benefits and Minimize Harms

The main harm of California's water policies to date has been the wholesale conversion of our natural waterways. In order to maximize the benefits of water while minimizing those environmental harms, the state needs to build an environmentally-conscious water supply. First, recognizing that we have enough (the mindset shift of Pillar 1) would mean recognizing that we do not need to further increase how much water we extract from the environment. Rather than building new dams or desalination plants, investing in water recycling would mean that we maintain a reliable supply without further harming the environment. Streamlining permitting requirements and providing funding for utilities that want to expand water recycling programs (see Pillar 3) would help make water recycling less expensive and more widely adopted.

Second, we can work with the natural environment as a critical component of our water supply. In particular, rethinking how we manage the forests that serve as our watersheds can lead to improvements in both water supply and water quality (Shah et al., 2022). Native forests promote soil health; healthy soils are better able to soak up heavy rain events (preventing floods) and then slowly release the water into streams or rivers. Because of these qualities, native forests often increase overall water yields compared to tree plantations (Little et al., 2015). Avoiding large timber harvesting is also beneficial for water quality, as timber harvesting activities increase sediment, nutrient loads, and dissolved organic carbon levels in downstream water supplies, each of which water utilities would need to remove (Shah et al., 2022). On the other hand, wildfires can have a highly detrimental effect on water quality (Murphy et al., 2018). In addition to increased erosion and sedimentation, which can clog water treatment facilities, fire can also mobilize heavy metals present naturally or from historic mining activities (Murphy et al., 2020). Thus, thinning trees and implementing small managed

burns that prevent large fires have additive effects for ensuring water abundance.

Finally, there are policy tools to ensure that the environment continues to receive water even as humans are extracting it for our use. In particular, instream flow requirements mandate that a particular percentage or volume of water is left in rivers. At present, many California rivers do have instream flow requirements, often mandated by licenses to operate hydropower facilities issued by the Federal Energy Regulatory Commission (Schramm et al., 2016). As for state-level policies, California has a variety of laws that enable the state to consider and enact instream water uses, some dating to the early 1900s. While these policies were minimally implemented through the 1900s, in 1983 a California Supreme Court decision (National Audubon v. Superior Court) clarified that the state had to consider instream uses under the public trust doctrine. Since then, enforcement of instream flow laws has improved and parts of some rivers have protection (Boettiger et al., 2024). However, the laws do not cover every waterway in the state. There are substantial opportunities to improve our use of instream flows, both by increasing coverage across the state and revising specific flow requirements to better reflect scientific best practices (Grantham et al., 2022; Stein et al., 2021).

Practice 2: Make Informed Tradeoffs Based on Community Input

The water sector has historically had relatively minimal public engagement. Residents and businesses expect to receive water when they need it, but water utilities (whether municipal or agricultural) are quasi-black-box entities for the average member of the public. While several large water policies like the Integrated Regional Water Management Planning Act and the Sustainable Groundwater Management Act (SGMA) have had building collaboration across organizations at their core, the participants in those planning processes have tended to be formal organizations (water utilities, nonprofits, government agencies) rather than community-based organizations or members of the public (Dobbin & Lubell, 2021; Hui et al., 2020).

In addition, when public engagement is included in water policy, the agricultural sector exerts substantial power and influence on the outcome of these decisions. Even in instances when policies have explicit provisions to prioritize disadvantaged communities, actual implementation leaves these communities out. For instance, SGMA is supposed to focus on water needs for disadvantaged communities, but multiple studies have shown that Groundwater Sustainability Plans prioritize agricultural interests over municipal or environmental interests (Dobbin & Lubell, 2021; Escobedo Garcia, 2024; Perrone et al., 2023).

Where building community buy-in is most important is for communities that have historically been harmed by their water utilities, especially those who have received contaminated water. Here, even if the utilities are able to upgrade their infrastructure and start providing reliable water, building trust among community members that the water is in fact clean will require substantial effort. Simply telling people that the water is clean is unlikely to be sufficient.

Decision-makers can demonstrate that the water is clean by directly consuming it or funding independent water quality tests conducted by community-selected organizations.

Practice 3: Generate New Ideas and Activate Partnerships

A key challenge for innovation is that water utilities, most of which are government-run in California, are relatively risk averse and reluctant to change (Baehler & Biddle, 2018; Tanner et al., 2018). Overall, water utilities are happy to adopt new practices if they have seen other utilities successfully use those practices, but are rarely willing to pioneer something that hasn't been tested yet. This means that encouraging change will require significant incentives from the state. These incentives could come in the form of carrots, like funding, or sticks, like mandates, to incorporate best practices. The state could also work more closely with utilities that have shown willingness to innovate (see e.g., Barillo, 2019) and develop and implement pilot projects that could be beneficial.

As for activating partnerships, inter-organizational collaboration, especially government-utility-civil society collaboration, is common in the water sector, making this practice less of a priority.

Conclusion: Pathways toward Abundance

There are numerous policy pathways to build water abundance in California. Low-hanging fruits include (1) programmatic permits to allow for more widespread development of water recycling and groundwater recharge, (2) funding and capacity-building for small water systems that struggle to meet water quality standards, and (3) managing our forests to promote healthy native ecosystems. However, true abundance will require tackling some long-held practices in California water supply and distribution. Our system of prior appropriation is fundamentally at odds with distributing water equitably. While overhauling water rights is a political third-rail in California, other western states have engaged in small-scale reforms to their prior appropriation systems, such as by sharing shortages equally among all water rights holders rather than allocating them based on seniority. In addition, when regulating water, the state legislature tends to defer implementation to local governments with minimal penalties for noncompliance. This has hampered the impact of numerous well-meaning laws, including the Human Right to Water Law and the Sustainable Groundwater Management Act. By setting strict standards for compliance and holding utilities and local governments accountable to those standards—paired with capacity building support for poorer or smaller entities that need help to comply—we have a much better chance of reversing groundwater overdraft and ensuring access to clean, affordable water for all Californians.

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