

Managing Drought in a Changing Climate: Four Essential Reforms

Climate change is bringing pressures that will seriously impact California's water system: warming temperatures, shrinking snowpack, shorter and more intense wet seasons, more volatile precipitation, and rising seas. The unusually warm drought of 2012–16 provided a crucial test of California's ability to manage severe water scarcity, along with lessons on adapting to conditions that are expected to become more common. The following four reforms can help reduce the social, economic, and environmental costs of future droughts.

Climate Pressures

Warming temperatures

Shrinking snowpack

Shorter wet seasons

More volatile precipitation

Rising seas

Reform 1: Plan Ahead

Successful adaptation requires advance planning at both local and regional scales. Top priorities:

- **Strengthen urban water management plans.** Plans should incorporate stress tests of supplies to account for longer droughts and the impacts of increased warming. The state should provide oversight, incentives, and guidance on incorporating climate projections into these tests.
- **Ensure effective groundwater sustainability plans.** Successfully implementing the Sustainable Groundwater Management Act is the most important step toward drought security for California agriculture. Sustainability plans should prepare for groundwater drawdowns during severe droughts and pursue coordinated, regional approaches on recharge and land fallowing.
- **Develop drinking water plans for rural communities.** Drinking water vulnerabilities in disadvantaged rural communities will worsen with climate change. State and local partners should identify communities at highest risk, connect them to larger systems where feasible, and devise drought resilience programs for the rest.
- **Prepare ecosystem drought plans.** Reducing the impact of future droughts requires watershed-level drought plans for freshwater ecosystems. These plans should identify actions to prepare for drought and to help with post-drought recovery. Strategic investments in water acquisitions and climate-resilient habitat—such as streams fed by cold water springs—can help protect at-risk species during drought.

Reform 2: Upgrade the Water Grid

Climate pressures will make it harder to simultaneously store water for droughts, manage flood risk, and protect freshwater ecosystems. Modernizing California's "water grid"—the linked network of above- and below-ground storage and conveyance systems that connects most water use in the state—can help reduce costs of future droughts. Investments should favor projects that provide multiple benefits and increase resilience. Top priorities:



- **Improve conveyance and storage capacity.** California's aging water infrastructure needs an overhaul to improve its ability to adapt to a changing climate. Priorities include repairing dams and expanding conveyance to support groundwater storage and water trading and sharing programs.
- **Modernize and integrate operations.** Adapting to a warmer, more volatile climate will require introducing more flexibility into the operation of storage and conveyance facilities and ensuring they work together as an integrated water supply and flood management system. One key opportunity for better integration is to merge the federal Central Valley Project and the State Water Project into a single entity that functions as a regulated, independent wholesale water utility. Regionally, there are also many opportunities to integrate the operation of local water systems.

Reform 3: Update Water Allocation Rules

California should undertake a comprehensive update of water allocation rules. The goals should be to find equitable and efficient ways to allocate supplies among competing demands during dry times while promoting efforts to capture and store water during wet times. Top priorities:

- **Promote groundwater recharge.** The rules governing diversion of water from rivers for groundwater storage are unclear, and permitting needs to be more expeditious to take advantage of high flows. The State Water Board should update rules governing capture and recharge during high flows.
- **Streamline trading and banking.** Limitations in conveyance infrastructure are compounded by difficulties in securing permits for trades and groundwater banking partnerships, where parties work together to store water. Simplified environmental reviews and pre-approved transfers are needed.
- **Give the environment a water budget.** Current practices do not provide enough flexibility to manage flows in support of freshwater ecosystems. Granting ecosystems water budgets that can be flexibly managed like a water right—including storing and trading—would allow managers to prepare for and manage drought. It would also reduce conflict over scarce supplies.
- **Improve water rights administration.** The State Water Board should have more comprehensive jurisdiction over water rights—including permitting authority over all surface water rights, and groundwater pumping that has a significant effect on surface water resources.

Reform 4: Find the Money

The state's water system has numerous areas where available funding is far below ongoing needs. Reliable sources of funding are crucial for adapting to climate change. Top priorities:

- **Use general obligation bonds for public benefit.** State bonds should be used for projects that address environmental or social justice concerns, or provide other demonstrable public benefits such as flood protection or restoration of groundwater basins.
- **Fill the gap for fiscal orphans.** Underfunded areas—including safe drinking water, ecosystems, flood and stormwater management—face a gap of \$2–\$3 billion per year. Closing it will require a broader, more reliable mix of state and local funding sources, including new fees and taxes.
- **Reform water pricing law.** Proposition 218 limits the ability of publicly owned water utilities to charge higher prices during drought. In addition, utilities need more flexibility to implement “lifeline rates” to maintain affordability for poor residents. The legislature and state voters should address the obstacles to efficient, equitable water pricing created by Proposition 218.

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