PPIC

Water

CALIFORNIA'S FUTURE

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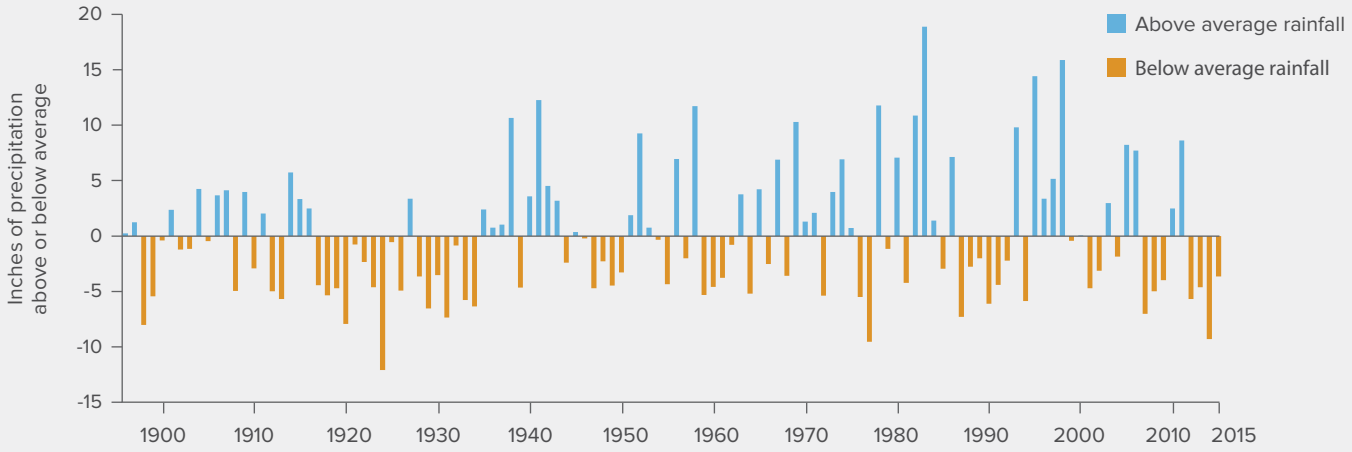
California faces growing water management challenges

Water management in California has always been difficult. The state's variable climate is marked by long droughts and severe floods, with stark regional differences in water availability and demand. California has adapted by building a vast network of storage and conveyance facilities that deliver water from the wetter parts of the state to population and farming centers in the Bay Area, Southern California, and the Central Valley.

Water management challenges are many. The Sacramento–San Joaquin Delta is a fragile link in the state's water supply network. Agricultural demand is becoming less flexible as farmers plant more tree crops, especially nuts, which must be watered every year. Conflicts are growing between human water use and water needed to support fish and other wildlife. And the current drought is stressing water management systems throughout California, giving a glimpse into an uncertain future under climate change.

Solutions to California's water management challenges are not easy, but they are achievable. They will involve difficult and sometimes costly trade-offs, as well as hard-to-achieve legal and political changes.

CALIFORNIA'S VARIABLE CLIMATE LEADS TO DROUGHTS AND FLOODS



SOURCE: Western Regional Climate Center.

NOTE: Bars show the number of inches above and below the long-term California statewide average precipitation level of 21.42 inches per year, based on water years 1896 through 2015.

California's latest drought reveals strengths and weaknesses

In 2015, California experienced a fourth year of severe drought. Water flows and the mountain snowpack registered record lows. Temperatures reached record highs. This stress test of California's water systems provides key lessons for drought management today and in the future.

- **Investment in diversified water supplies pays dividends during droughts.**
  The drought has not significantly harmed the economy. Most urban and suburban areas—the source of 98 percent of California's output of goods and services—have been coping fairly well, benefiting from significant past investments to improve and diversify supplies and manage demand.
- **Groundwater is the state's most important drought reserve, particularly for agriculture.**
  During droughts, farmers rely heavily on groundwater to replace lost surface water supplies. However, the current rate of groundwater withdrawals is unsustainable, making this resource less reliable. Groundwater withdrawals

cause other problems as well, including sinking lands, which damages infrastructure, and reduced river flows, which harms aquatic habitat. The 2014 Sustainable Groundwater Management Act requires local water users to manage basins sustainably.

- **Drought increases hardships for disadvantaged rural communities.**
  Many small, poor rural communities have lost drinking water supplies as their wells have gone dry. Emergency responses have limited the hardship, but long-term solutions are needed to ensure safe water supplies.
- **Drought is a severe problem for the state's rivers, wetlands, and forests.**
  The state has not prepared adequately for drought impacts on ecosystems. With rivers at record lows, at least 18 fish species, including most salmon, are at high risk of extinction if the current drought continues. Shrinking wetlands threaten waterbirds. Severe wildfires endanger public safety and the long-term health of the state's conifer forests.

Sacramento–San Joaquin Delta instability is a major challenge

The Delta supplies water to more than 25 million people and 3 million acres of farmland. Earthquakes and a rising sea level threaten levees that protect water quality. Water management to help declining native fish species—many classified as endangered—disrupts water exports. Political indecision hampers efforts to solve the Delta's problems.

- **The state needs to make a strategic decision about the future of Delta exports.**
  The current system relies on pulling water directly through Delta channels to the pumps. A new management plan, known as the California Water Fix, would construct two tunnels to tap water upstream on the Sacramento River and move it underneath the Delta to the pumps. This plan would improve water supply reliability and quality, and provide flexibility in managing water for the environment. The plan is costly, but failing to address threats to the Delta may prove more expensive as water supply becomes less reliable.

California has only just begun to address extreme flood risks

One in five Californians live in areas with significant flood risk. Most are uninsured. Flood risks are expected to grow as the climate changes and sea level rises. Although the state has recently increased investment in flood control infrastructure, more funding and other actions are needed to keep development out of harm's way.

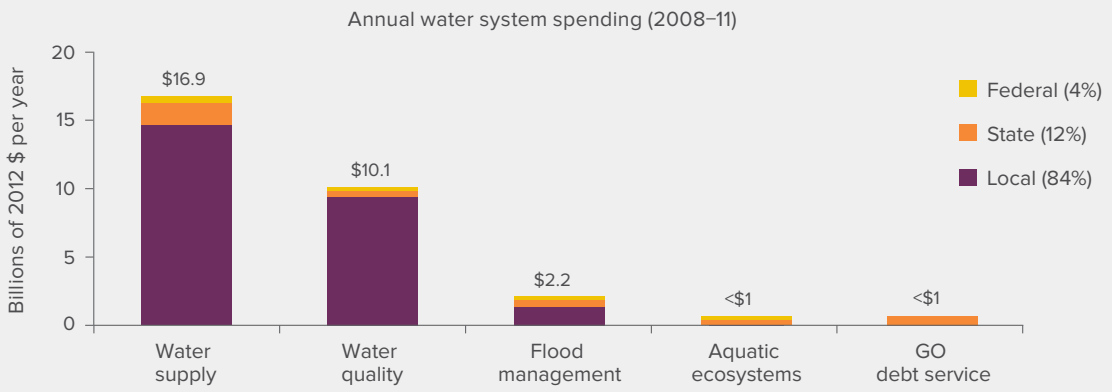
- **Local governments and residents need incentives to limit flood risk exposure.**
  Federal flood insurance regulations only restrict new development in areas of extreme flood risk susceptible to a 100-year flood. A 2007 state law requires that local governments in the Central Valley provide double that level of protection for new homes, but weaker federal standards still apply elsewhere. Insurance policies do not adequately account for increasing risks from climate change and rising sea level.
- **Local governments should consider future conditions when approving new development.**
  State law requires cities and counties to consider sea level rise and climate change in hazard mitigation planning. But as yet there is no requirement to reduce development in areas likely to be at higher risk in the future.

Californians must decide how to fill funding gaps

California's local agencies raise most of the more than $30 billion spent annually on water management. Urban water and wastewater agencies do reasonably well raising funds to provide safe and reliable service. In contrast, the state faces critical funding gaps in five orphan areas where lines of authority and responsibility are not clearly delineated: provision of safe drinking water in small, disadvantaged communities; flood protection; management of stormwater and other polluted runoff; aquatic ecosystem management; and integrated water management.

- **California needs to move beyond bonds to fill funding gaps.**
  Californians pay for the vast majority of water system expenditures through their monthly water and wastewater bills. But since 2000, the sector has been relying more heavily on state general obligation (GO) bonds serviced with general tax dollars. Bonds have helped local water agencies fund some innovative projects. Yet bonds provide at most $1 billion per year and do not address all critical gaps. Even with the passage of a $7.5 billion bond in November 2014, other funding sources are needed.

LOCAL AGENCIES RAISE MOST MONEY SPENT ON WATER



SOURCE: Ellen Hanak et al., *Paying for Water in California* (PPIC, 2014), Table 1.

NOTE: Water quality includes wastewater (~$9.6 billion) and stormwater (~$500 million).

- **Legal constraints are an obstacle to sustainable local funding of gaps.** Three constitutional reforms approved by voters since the late 1970s—Propositions 13, 218, and 26—severely limit the ability of local agencies to raise funds to fill critical gaps and to address rising costs. To definitively solve this problem, California must better align its funding laws with modern water management goals.

California must improve management of aquatic ecosystems

Beyond the Delta, California faces rising demand for environmental water, healthy watersheds, and clean beaches. The drought has highlighted the major challenges in meeting sometimes-conflicting environmental goals.

- **The state needs to stop the decline of native fishes.** Populations of native fish species—an important indicator of overall freshwater ecosystem health—are declining across the state despite decades of well-intentioned efforts and expense. These declines heighten conflicts with other water management goals because they lead to tighter and costlier restrictions on water supply, wastewater, and flood protection projects.
- **Ecosystem-based approaches can help.** Environmental management is often carried out in silos. Each agency and each project addresses particular issues—water quality, wetlands, flows, habitat—in specific locations, with no integrated vision of how to foster overall ecological improvement. Coordinated, flexible approaches that seek to improve environmental performance of entire watersheds would be much more effective in protecting native species—and would let California allocate both dollars and environmental water more wisely.

Looking ahead

California has the tools to help secure a safe and reliable water supply, improve conditions for aquatic species, and reduce flood risks. Water managers have made significant progress toward these goals. But challenges are increasing as the population grows and the climate changes. Increased policy reform momentum—coupled with new investment—is essential. Some changes will be politically difficult. The following priority issues require sustained attention.

Preparing for droughts. California should learn from the latest drought to better prepare for the next one. The state must improve interagency coordination and management of water rights, water transfers, and ecosystems.

The Delta. The proposed new tunnels could potentially safeguard the Delta's environment while maintaining water supply reliability. But this approach requires well-designed policies on governance, finance, and mitigation for Delta landowners and residents.

Ecosystem protection. Beyond the Delta, a more comprehensive, coordinated, and proactive approach is needed to support California's aquatic ecosystems and the species that depend on them.

Groundwater management. The new groundwater legislation will improve management of most basins in California. But implementation will be challenging, especially for agricultural regions that rely heavily on unsustainable groundwater withdrawals.

Flood risk exposure. To reduce risks to new development, floodplain mapping should account for climate change and increasing flood risk. The state must create incentives for communities to reduce risk.

Funding. Legal reforms are needed to allow local and state agencies to fill funding gaps for drinking water quality, flood protection, stormwater management, aquatic habitat, and integrated water management.

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