CALIFORNIA WATER WORKS

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The California water system is a vast and complex network of federal, state and local projects and agencies that supplies water to more than 38 million people and 10 million acres of agricultural land. The water must be moved from where it is found (primarily in the north) to where it is needed (primarily in the central and southern parts of the state). The delivery system includes reservoirs, pumping stations, dams, lakes, aqueducts, canals and more. It is an engineering marvel — and sometimes an environmental mess. Most experts agree that a hotter and drier future will require more effective management of water resources.

Central Valley Project

Operated by the U.S. Bureau of Reclamation, the CVP extends for 400 miles from the Cascade Range near Redding to the Tehachapi Mountains near Bakersfield. With nearly two dozen dams and reservoirs and 500 miles of canals and aqueducts, it provides water to about one-third of the agricultural land in the state, as well as nearly 1 million households.

Metropolitan Water District

The MWD brings 1.5 billion gallons of water each day to more than 19 million people in six Southern California counties via the Colorado River Aqueduct and the State Water Project. It also is the largest distributor of treated drinking water in the United States. The MWD serves more than 300 cities and unincorporated communities.

State Water Project

The largest state-built delivery system in America, it is run by the Department of Water Resources. The SWP begins at Lake Oroville on the Feather River, picks up water from additional lakes and rivers and brings it through reservoirs, canals and pipelines to the Sacramento-San Joaquin Delta, where the water is pumped to the 444-mile California Aqueduct and channeled to 25 million people and 750,000 acres of farmland throughout the state.

All American Canal

Eighty miles long, this gravity-flow canal brings 3.1 million acre-feet of water annually from the Colorado River to nine cities and towns and a half million acres of farmland in the Imperial Valley, where groundwater is unsuited for domestic purposes.

Salton Sea: A breach in canals during the early 1900s created California's largest lake. Because it had no outlet, it grew salty and is now 50 percent more saline than the ocean. Nonetheless, it supports more than 400 kinds of birds. Inflow may be curtailed next year, but some scholars and water experts want to save the lake.

WaterFix

Gov. Jerry Brown wants to burrow two tunnels 40 feet wide and 35 miles long under the Sacramento-San Joaquin Delta to deliver water to farms and homes in the San Joaquin Valley and Southern California. Proponents say the tunnels will help control salinity and water flows that harm fish. Opponents say the diversions will further harm fish and protect the water supplies of Southern California and Silicon Valley.

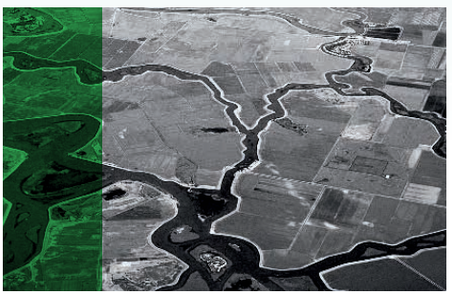
Runoff

Billions of gallons of runoff flush from California out to the Pacific after storms. Los Angeles captures 8.8 billion gallons annually. Mayor Eric Garcetti has outlined a plan to increase that amount to 50 billion gallons by 2035. Some experts say that more than 200 billion gallons could be captured each year statewide.

Desalination

The state's biggest plant, a $1 billion installation, opened last December in Carlsbad. Some 15 other projects have been proposed, from San Francisco to the Mexican border. Santa Barbara might restart its desalination plant, taken offline in 1992. Southern California Edison operates a desalination plant on Catalina Island that can produce 200,000 gallons of water a day. Environmentalists worry about brackish wastewater and killing sea life.

Sacramento-San Joaquin Delta



This is the largest estuary on the coast, where the Sacramento and San Joaquin rivers meet. It is the hub of California's water system. Water from the CVP and the SWP flow through here. Agriculture and human consumption compete with an ecosystem rich in wildlife (even salmon from the Pacific), causing a decline in the delta. Long-term solutions are elusive.

Hetch Hetchy Reservoir

In 1913, San Francisco won the right to dam the Hetch Hetchy Valley, considered a rival to Yosemite Valley in beauty and grandeur. After decades of controversy, the Hetch Hetchy was flooded, and water began streaming to the city in 1934. Some conservationists want the dam removed and the valley restored.

Los Angeles Aqueduct

Designed by William Mulholland, it carries water more than 200 miles from the Eastern Sierra into Southern California, driven entirely by gravity. The Los Angeles Department of Water and Power, which operates the aqueduct, has been ordered by courts to mitigate environmental damage caused by diversion of streams.

Mono Lake: Water level must be maintained at 6,392 feet above sea level to protect bird breeding and stream habitat.

Lower Owens River: Sixty-two miles are being re-watered, along with surrounding habitat.

Owens (Dry) Lake: It was once the worst source of air pollution in the nation because of blowing toxic dust. Mitigation efforts were enhanced when the Lower Owens River resumed water flow.

Colorado River Aqueduct

Owned and operated by the Metropolitan Water District, it picks up Colorado River water at Lake Havasu, Arizona, and takes it 242 miles to Lake Mathews in Riverside County, from where it is distributed among the MWD's 26 member agencies. Competing demands and diminishing supplies are causing environmental harm to the river, which is expected to worsen as climate change impacts watersheds.

Sources: California Department of Water Resources; California State Water Project Atlas; California Water Atlas; Imperial Irrigation District; Los Angeles Department of Water and Power; Los Angeles Times; Metropolitan Water District; The Nature Conservancy; New York Times; Pacific Institute; Public Policy Institute of California; Sacramento Bee; San Diego Union-Tribune; Sierra Club; Southern California Edison; U.S. Bureau of Reclamation