



Hetch Hetchy and California Water Supply

Updated August 2018

Overview

Hetch Hetchy Valley in Yosemite National Park evokes powerful and compelling images of waterfalls cascading off soaring granite cliffs, with groves of pine, fir and oak shading the banks of the Tuolumne River as it meanders through a flowering mountain meadow. Such a scene greeted naturalist John Muir when he first visited Hetch Hetchy Valley in 1871. Muir called the valley "one of nature's rarest and most precious mountain temples" and described it as a "wonderfully exact counterpart" to its better-known sister, Yosemite Valley. The notion that Hetch Hetchy Valley could be restored has ignited the imaginations of Californians and Americans as the opportunity of a lifetime.

Some critics of the proposal have questioned whether restoration should be considered because of the impact to water storage capacity in semi-arid California. They say, "California needs more storage, not less" and contend that new water supplies, especially storage facilities, are no longer being developed in California. They do not believe that it is practical to replace the water supply of Hetch Hetchy Reservoir, and thus the valley should not be restored.

Balancing these opposing points of view presents a challenge. It is important to point out that, in a statewide context, the volume of water at stake in the debate over Hetch Hetchy is relatively small. This report documents two important points:

- Other environmental restoration projects have required water system improvements in far greater magnitude than restoration of Hetch Hetchy Valley would require of San Francisco.
- Water supply improvements in California over the last 25 years have accounted for more than 17 times the storage volume of Hetch Hetchy Reservoir.

While Hetch Hetchy Reservoir's storage capacity is modest in a statewide context, it is important to the communities it serves. Any proposal to restore Hetch Hetchy Valley must assure that the San Francisco Public Utilities Commission (SFPUC) system can still deliver ample, reliable, high-quality water to its customers in San Francisco and other Bay Area communities¹. Likewise, it is essential that San Francisco's modified system be operated to fully protect the Turlock and Modesto Irrigation Districts, which also rely on the Tuolumne River.

Recently Developed Water Supply

Water supply development continues in California, though today's solutions are different from those adopted during the middle of the 20th century. Today there are few practical opportunities to build new dams that would impound the natural flow of a large river. Most of California's major rivers are either already dammed, protected by law, or too remote to be economically developed. Innovative water managers are finding, however, that they can extend supplies in a variety of ways, including increased efficiency, recycling, local storage, groundwater recharge, and transfers and exchanges with other agencies that have different sources and different needs.

The dearth of opportunities to build dams on free-flowing rivers has not impeded development of additional water supply storage in California. Since 1990, more than 5,500,000 acre-feet of storage have been developed. Two of these projects, Los Vaqueros and Diamond Valley Reservoirs, are "off-stream" surface reservoirs. The others are groundwater aquifers that have been developed either to serve local communities or to use as "banks" that exchange ground and surface supplies, using California's vast network of canals, with distant communities in dry years. Table 1 provides a brief description of some of these projects.

Storage capacity alone does not equate to water supply reliability, but it is perhaps the simplest way to think about replacing the 360,000 acre-feet of capacity that Hetch Hetchy Reservoir provides. While some agencies have constructed new reservoirs, most new storage is underground, where infrastructure has been put in place to replenish and manage depleted aquifers. Some communities have invested in their own groundwater, and others have entered into banking contracts with agencies hundreds of miles away. For example, Santa Clara Valley Water District's contract with Semitropic Water Storage District includes storage capacity of 350,000 acre-feet - almost identical to the storage capacity of Hetch Hetchy Reservoir.

Recently Implemented Ecosystem Restoration Programs

Californians have consistently demonstrated support for environmental protection and restoration programs. Over the few decades, several water supply projects in California have been modified to dedicate additional water to restore rivers, lakes

and other waterways. As a result of these changes, water agencies have sought additional supplies to replace the water dedicated to restoration programs.

These programs, designed to restore ecosystems and wildlife populations on rivers and in wetlands in the Central Valley, at Mono Lake, in the Bay-Delta and on the Trinity River, have posed challenges for the agencies that they have affected. Most agencies have found ways to invest in additional supplies and/or use water more efficiently. The comparatively small change in delivery capability that would result from restoration of Hetch Hetchy Valley could, should and would be replaced by system improvements in San Francisco’s Regional Water System. Table 2 provides a brief overview of these programs.

Table 1
 Recently Developed California Water Storage Projects

<u>Project</u>	<u>Size</u> <i>(acre-feet)</i>	<u>Description</u>
Kern	2,500,000	Groundwater aquifer developed jointly by Kern County Water Agency, Kern Water Bank and the City of Bakersfield. Most of these supplies are used locally, but some of this water has been sold to other regions.
Semitropic	1,650,000	Groundwater storage, developed by Semitropic Water Storage District, serving as a water bank for a variety of agencies in northern and southern California. Additional capacity is available for new partners. ²
Diamond Valley	810,000	Surface reservoir built and paid for by Metropolitan Water District of Southern California (MWDSC) to improve dry-year reliability.
Arvin-Edison	350,000	Groundwater storage, developed by Arvin-Edison Water Storage District, serving as a water bank for MWDSC.
Yuba County	200,000	Additional groundwater storage developed by the Yuba County Water Agency.
Los Vaqueros	100,000	Surface reservoir built and paid for by Contra Costa Water District for drought reliability and to improve water quality.
Urban Southern California Groundwater	212,000	Local Groundwater Storage (Long Beach, Chino, Orange County, Compton etc.) Projects managed by Metropolitan Water District of Southern California
Total	5,522,000	

Table 2
Recent Aquatic Ecosystem Restoration Programs³

<u>Program</u>	<u>Water Supply Dedication</u> <i>(acre-feet per year)</i> ⁴		<u>Description</u>
	Avg. Year	Dry Year	
Central Valley wildlife refuges ⁵	250,000	200,000	Signed in 1992 by President George H.W. Bush, the CVPIA dedicates additional water to the environment for both fisheries and wildlife refuges in the Central Valley. Only the refuge portion is shown here.
Mono Lake ⁶	46,000	30,000	Decision 1631, signed in 1994 by the State Water Resources Control Board, reduces the amount of water that the Los Angeles Department of Water and Power is allowed to divert from streams that feed Mono Lake, reversing the decline in the lake's water level. Mono Lake is an important habitat and breeding area for a wide variety of water birds.
Water Quality Control Plan (Bay-Delta Accord) ⁷	316,000	430,000	The Bay Delta Accord, signed in 1994 by stakeholder groups, was adopted in 1995 by the State Water Resources Control Board as the Water Quality Control Plan ⁸ . In the springtime, Delta outflows are increased and diversions are reduced to protect fish from direct entrainment in the Delta export pumps
Trinity River ⁹	83,000	155,000	The Trinity River Mainstem Fishery Restoration program was jointly developed by the federal government and the Hoopa Valley Tribe. Signed in 2000 by Interior Secretary Bruce Babbitt, the program includes increased releases from Trinity Dam to maintain and restore the river channel and to assist in the outmigration of young chinook and endangered coho salmon.
Endangered Species Act ¹⁰	980,000	572,000	Federal court rulings to protect Delta smelt (2007) and salmon (2008) include several protective operating criteria in the Delta, most prominently restrictions on the degree to which "Old" and "Middle" Rivers (parts of the lower San Joaquin River) are allowed to run backward.
Total	1,675,000	1,387,000	

Hetch Hetchy in Context

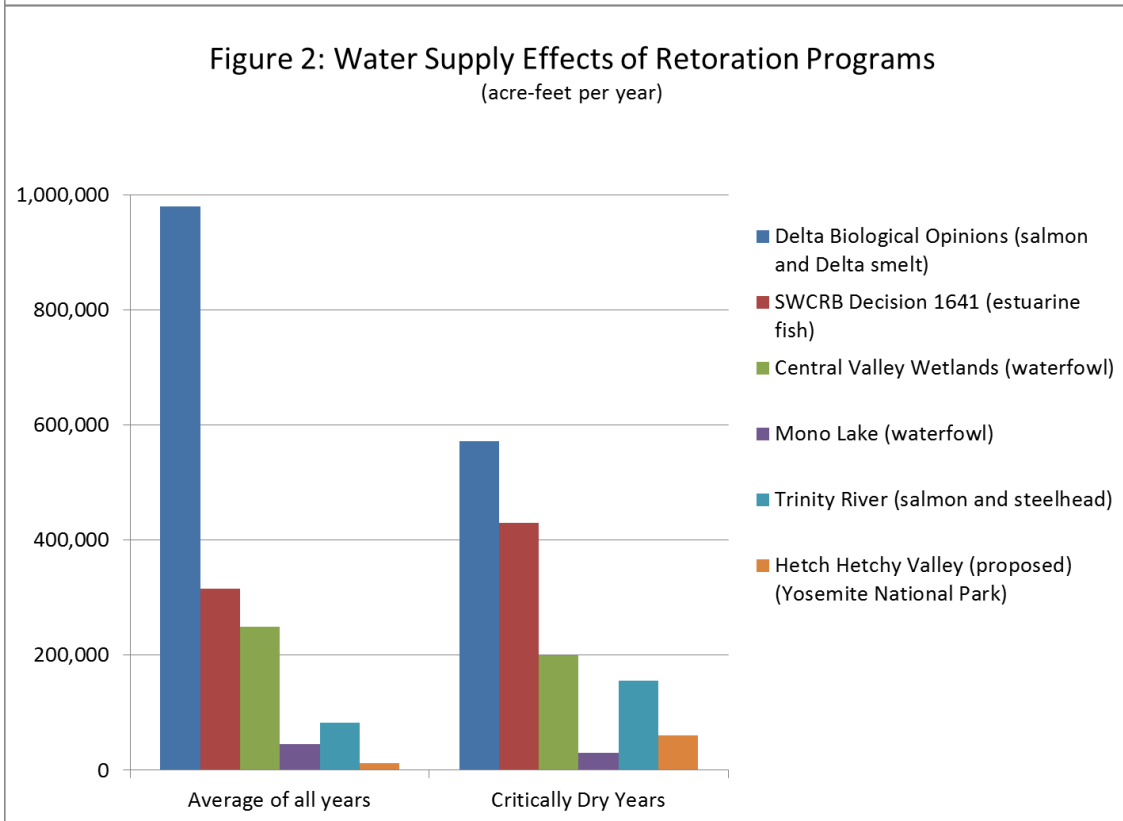
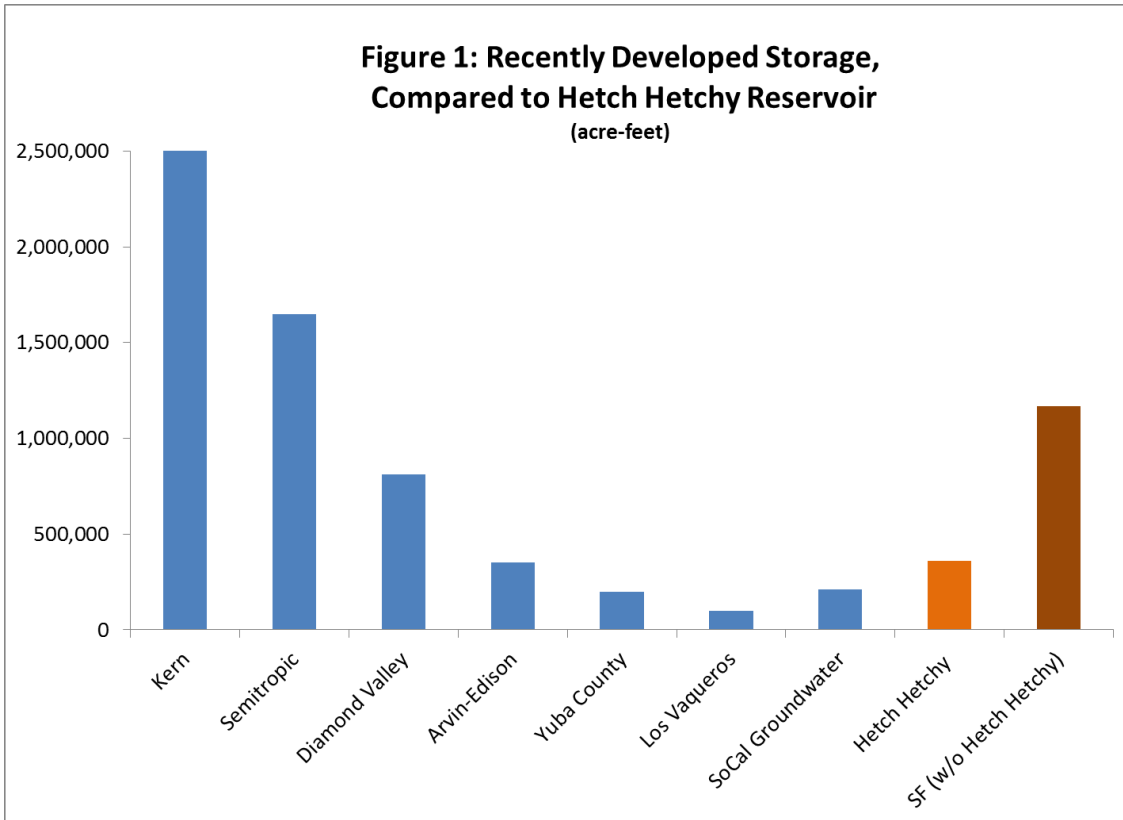
Restoring Hetch Hetchy Valley in Yosemite National Park would benefit a wide array of wildlife as well as park visitors throughout California, across America and around the world. Restoring the valley would involve elimination of Hetch Hetchy Reservoir, reoperation of other system reservoirs and acquisition of new supplies in dry years. In contrast, the restoration programs identified above keep all existing reservoirs intact and involve only reoperation and new supply acquisition. Overall, however, the water supply implications of restoring Hetch Hetchy Valley are significantly less than the other restoration programs.

Restore Hetch Hetchy believes that facilities to replace water supply should be developed before Hetch Hetchy Valley is restored. Increasing storage capacity, either surface or groundwater, is a key part of the water supply solution. Figure 1 compares the current storage capacity of Hetch Hetchy Reservoir with other recently developed storage and with other facilities in the San Francisco Public Utilities Commission's system.

Without Hetch Hetchy Reservoir, in most years, the SFPUC could fully meet customer demands without diminishing reliability. In dry years, additional supplies amounting to about 20% of annual delivery objectives would be required to replace the supply provided by Hetch Hetchy Reservoir.¹¹ Figure 2 illustrates the water dedicated to the environment under the ecosystem restoration programs described above and compares it to the water supply that would need to be replaced for Hetch Hetchy Valley to be restored.

Restoring Hetch Hetchy Valley will require replacement the water supply, water quality and hydropower that the reservoir now provides. In terms of water supply, however, it is evident that the amount at stake under a restoration scenario is minor by statewide standards and is far less than either recently developed storage projects or recently adopted ecosystem restoration projects.

Water supply alternatives, such as the increased local surface storage, groundwater banking, dry-year purchases and recycling that have been successfully implemented by urban agencies throughout California in recent years, should be implemented to replace the water supply that would be lost if Hetch Hetchy Valley is restored. Ultimately, any water supply solution should be developed in a public forum that includes and protects all communities that rely on the Tuolumne River for water and power.



¹ As described in *Paradise Regained: Solutions for Restoring Yosemite's Hetch Hetchy Valley* (Environmental Defense, 2004) and other reports, a replacement plan for lost hydropower must be adopted as well.

² See <http://www.semitropic.com/BankingPartners.htm>

³ All restoration programs described herein include non-flow elements that extend far beyond the additional dedication of water supply.

⁴ Net water supply dedicated to the environment is reported on both an average and a dry year basis. For the purposes of this discussion, dry years are generally defined as occurring in 1 out of 5 years.

⁵ U.S. Bureau of Reclamation <http://www.usbr.gov/mp/PA/water/docs>

⁶ SWRCB Decision 1631 - estimates of long-term reduced diversions.

⁷ Retrospective Analysis of Changed Central Valley Project and State Water Project Conditions

Due to Changes in Delta Regulations, Water and Power Policy Group, January 2013

⁸ The SWRCB officially adopted the Bay-Delta Accord as its "Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary" (May, 1995). The SWRCB has allocated responsibility for meeting the plan's objectives to the State Water Project and the Central Valley Project, initially as Order WR 95-6 (June, 1995).

⁹ Trinity River Mainstem Fishery Restoration, Environmental Impact Statement (2000).

¹⁰ Retrospective Analysis of Changed Central Valley Project and State Water Project Conditions

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¹¹ *Paradise Regained: Solutions for Restoring Yosemite's Hetch Hetchy Valley*, Environmental Defense (2004).