



Water and Power System Improvements Necessary to Accommodate Restoration of Hetch Hetchy Valley in Yosemite National Park

January 2018

The mission of Restore Hetch Hetchy is *to return the Hetch Hetchy Valley in Yosemite National Park to its natural splendor – while continuing to meet the water and power needs of all communities that depend on the Tuolumne River.*

Overview

Restoring Hetch Hetchy Valley is dependent upon replacing the water supply and hydropower benefits provided by O'Shaughnessy Dam and Hetch Hetchy Reservoir. System investments necessary to accomplish this task are eminently doable and are more easily implemented than the changes that other water agencies have implemented in recent years to diminish the impacts their systems have had on California's streams and wetlands¹. The reward for making these system improvements would be an extraordinary gift of nature - returning Hetch Hetchy Valley to the American people and to the visitors from around the world who flock to Yosemite National Park each year.

Since Secretary of the Interior Donald P. Hodel suggested that Hetch Hetchy be restored in 1987, a plethora of reports by government agencies, environmental groups and universities have analyzed how San Francisco and other Bay Area cities would be kept whole with respect to water and power.² There has been, however, no public forum in which the findings of these reports have been open to public scrutiny and/or independent review. San Francisco in particular has endeavored to avoid any such discussion.

Restore Hetch Hetchy seeks to have a public discussion of this the opportunity for restoration, wherein the merits of restoration can be compared to the costs of the water and power system improvements that would make it possible. It would ultimately be San Francisco's duty to develop and implement these improvements. Many if not all of the key elements of such a plan, however, are included in Restore Hetch Hetchy's complaint that was filed in Tuolumne County Superior Court on April 21, 2015.³ They are summarized below:

Existing System

The San Francisco Public Utilities Commission sells water to city residents and businesses and to other Bay Area cities – about 2.3 million people in all. About 85% of this water come from the Tuolumne River. San Francisco's rights to Tuolumne River flows are junior to those of the Turlock and Modesto Irrigation Districts, which use the majority of the river's flow. San Francisco's rights are ample for its needs in most years, but the City depends on water stored in reservoirs in dry years and especially in

Water and Improvements Necessary to Accommodate Restoration of Hetch Hetchy Valley in Yosemite National Park

Restore Hetch Hetchy
January 2018

extended droughts. San Francisco stores water in nine reservoirs – five of which are in the Bay Area. The remaining four reservoirs - Hetch Hetchy, Cherry, Eleanor and Don Pedro⁴ – are in the Tuolumne watershed.

Conveyance Improvements

Presently, most of San Francisco’s Tuolumne supplies pass through Hetch Hetchy Reservoir, generate hydropower at the Kirkwood Powerplant and are then diverted into its conveyance system at Early Intake (see Figure 1).

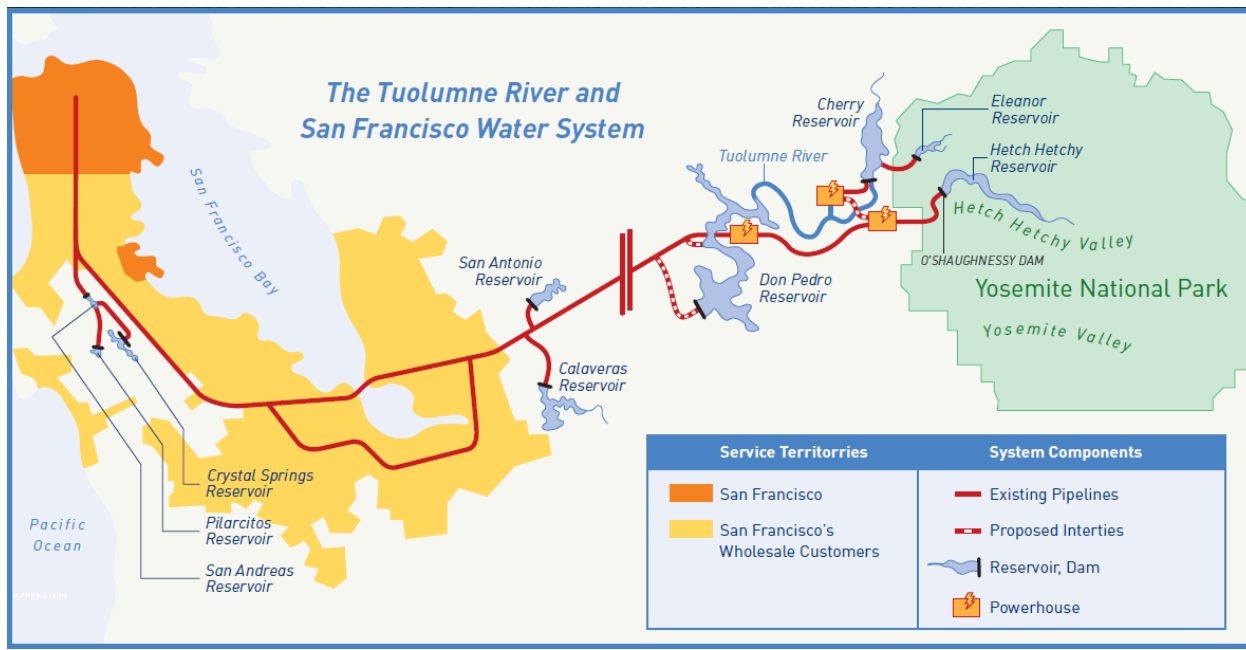


Figure 1: San Francisco's Regional Water System with proposed new conveyance

Restoration of Hetch Hetchy would require improvements to its conveyance infrastructure. Most importantly, a pipeline between the existing system and Holm Powerhouse (below Cherry Reservoir) should be constructed, allowing supplies stored in Cherry and Eleanor Reservoirs to be easily delivered to customers (cost estimate: \$M 56). An additional intertie to Don Pedro Reservoir would also be useful, if seldom used (cost estimate: \$M 63).

Water Supply

With additional conveyance in place, San Francisco would be able to deliver undiminished supplies in most years, but would require an additional 60,000 acre-feet of water in critically years to be kept whole. This amount is very small in comparison to the water supplies that other California agencies have foregone when required to meet environmental needs pursuant to the Bay Delta Accord (1994), the Trinity River Decision (2000) or Endangered Species Act rulings in the Bay-Delta (2007 and 2008).

Water and Improvements Necessary to Accommodate Restoration of Hetch Hetchy Valley in Yosemite National Park

Restore Hetch Hetchy

January 2018

Potential water supply replacements include:

- Groundwater banking in the Central Valley, as other water agencies have successfully implemented in far greater magnitude (cost estimate over 50 years: \$M 204);
- Water purchases (cost estimate over 50 years: \$M 309);
- Recycling additional water in the Bay Area; or
- Other water supply and conservation programs.

Water Treatment

San Francisco treats its water with a combination of chlorine, ammonia and ultraviolet light. Under a rare exemption from the U.S. EPA and the California Department of Health Services, San Francisco is not required to filter water diverted at Hetch Hetchy Reservoir. Water supplies released from other San Francisco Reservoirs are filtered at the City's facilities in Alameda and San Mateo Counties.

It is assumed that under restoration, these facilities would be expanded and all of San Francisco's water would be filtered (cost estimate over 50 years: \$M 387).

Hydropower

San Francisco operates three powerhouses in the Tuolumne watershed. None of these are in Yosemite National Park. When Hetch Hetchy Valley is restored there is expected to be little change to hydropower production at the Holm and Moccasin Powerhouses. Production at Kirkwood Powerhouse would not be possible much of the year, however, resulting in a loss of about 20% of San Francisco's total current hydropower production, or 350 gWh per year (cost estimate, replacing with solar power, over 50 years: \$M 669)

While all electric power is important, the hydropower that would be lost is less than one half the 896 gWh per year that will be lost when dams on the Klamath River are removed and is a small fraction of the power lost when California's San Onofre Nuclear plant was shut down.

Dam Modification

O'Shaughnessy Dam need not be removed, but it must be modified to allow the Tuolumne River to pass through unimpeded (cost estimate: \$M 374).

Time Frame

Restore Hetch Hetchy agrees with the Bay Area Water Supply and Conservation Agency, San Francisco's customers who use 2/3 of the total system supply, that system improvements "must be in operation, and all agreements fully executed, before draining the Reservoir."⁵

Water projects can be slow to plan and build, but with proper incentives all improvements should be possible within five years of a commitment to restore Hetch Hetchy Valley.

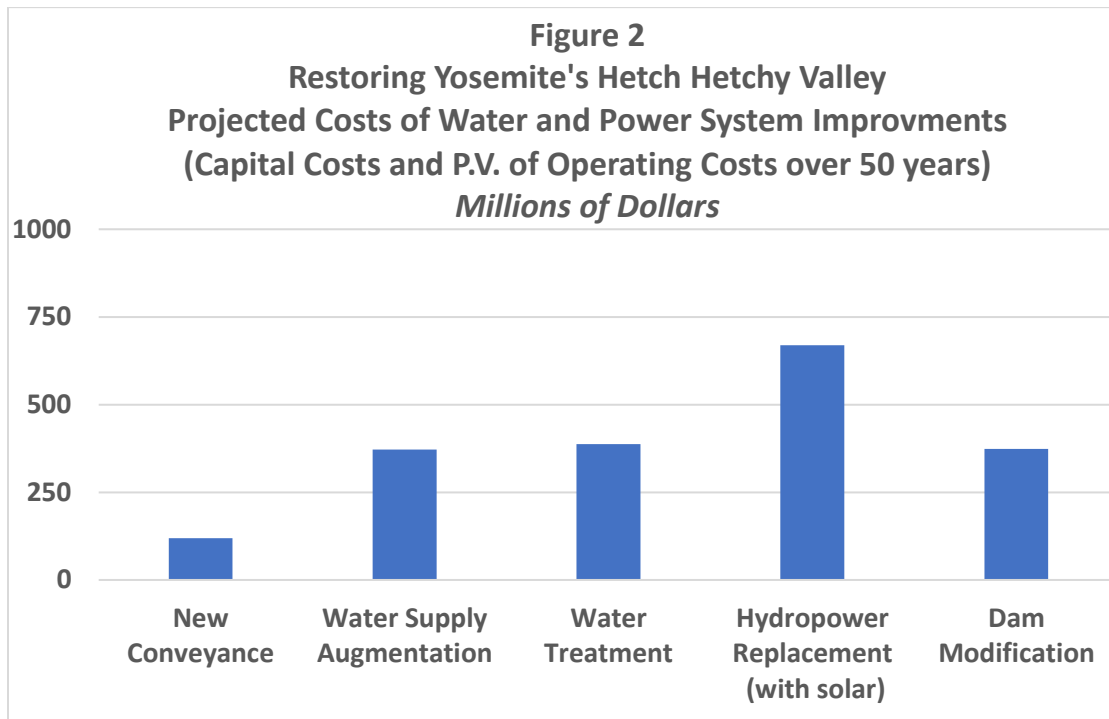
Water and Improvements Necessary to Accommodate Restoration of Hetch Hetchy Valley in Yosemite National Park

Restore Hetch Hetchy

January 2018

Total Cost of Water and Power System Improvements

As stated above, it will be San Francisco’s obligation to develop and implement system improvements to keep its customers whole when Hetch Hetchy is restored. The total estimated cost of doing so, however, by implementing the key elements described herein is approximately \$B 2 over a period of fifty years. See Figure 2.



¹ See http://www.hetchhetchy.org/fact_sheets.

² Reports are posted at <http://www.hetchhetchy.org/reports>.

³ A summary of litigation to date, along with links to court filings, is available at http://www.hetchhetchy.org/legal_campaign_update/.

⁴ San Francisco paid one half the cost of construction of Don Pedro Reservoir in exchange for a “water bank” in the reservoir that can hold between 570,000 and 740,000 acre-feet of water (compare to Hetch Hetchy Reservoir’s 360,000 acre-feet). It is owned and operated, however, by the Turlock and Modesto Irrigation Districts. To facilitate restoration, an additional agreement between the parties could provide San Francisco with additional flexibility for accessing its Tuolumne River supplies while simultaneously protecting the senior rights of the Districts.

⁵ http://bawasca.org/uploads/news/15_April21_BAWSCA_Statement_RHH11104956_final.pdf.