

San Francisco Public Utilities Commission Hydrological Conditions Report For September 2011

J. Chester, A. Mazurkiewicz, & M. Tsang, October 5, 2011



O'Shaughnessy Dam circa mid-1920 looks a bit different than the dam that stands today. The first lift of the dam was completed in 1923 to a height of 226.6 feet and impounded 206,000 acre-feet of water. The dam was raised during the 1930's and completed in 1938 to it's current height of 312 feet impounding 360,360 acre-feet of water.

Current Tuolumne System and Local Bay Area storage conditions are summarized in Table 1.

Table 1 Current Storage As of October 1, 2011							
Reservoir	Current Storage		Maximum Storage		Available Capacity		Percent of Maximum Storage
	Acre-Feet	Millions of Gallons	Acre-Feet	Millions of Gallons	Acre-Feet	Millions of Gallons	
Tuolumne System							
Hetch Hetchy ^{1/}	331,210		340,830		9,620		97.2%
Cherry ^{2/}	245,741		268,810		23,069		91.4%
Lake Eleanor ^{3/}	17,345		23,541		6,196		73.7%
Water Bank	567,659		570,000		2,341		99.6%
Tuolumne Storage	1,161,955		1,203,181		41,226		96.6%
Local Bay Area Storage							
Calaveras ^{4/}	35,078	11,430	96,824	31,550	61,746	20,120	36.2%
San Antonio	48,392	15,769	50,496	16,454	2,103	685	95.8%
Crystal Springs	46,937	15,294	58,377	19,022	11,440	3,728	80.4%
San Andreas	17,297	5,636	18,996	6,190	1,700	554	91.1%
Pilarcitos	2,218	723	2,995	976	777	253	74.1%
Total Local Storage	149,922	48,852	227,688	74,192	77,766	25,340	65.8%
Total System	1,311,877		1,430,869		118,992		91.7%

^{1/} Maximum Hetch Hetchy Reservoir storage with drum gates de-activated.

^{2/} Maximum Cherry Reservoir storage with all flash-boards out.

^{3/} Maximum Lake Eleanor storage with all flash-boards out.

^{4/} Available capacity does not take into account current DSOD storage restrictions.

Hetch Hetchy System Precipitation Index ^{5/}

Current Month: Isolated thunderstorm activity during September brought the six-station precipitation index to 1.13 inches, or 155.3% of the average index for the month.

Cumulative Precipitation to Date: The accumulated six-station precipitation index for water year 2011 is 59.95 inches, which is 168.8% of the average annual water year total, or 168.5% of the average annual-to-date. Hetch Hetchy received 69.99 inches of precipitation for water year 2011, which is the second highest water year accumulation in the record from 1919 to 2010. The Hetch Hetchy gauge is shown in Figure 1 in red, and is well above the median line.

^{5/}The precipitation index is computed using six Sierra precipitation stations and is an indicator of the wetness of the basin for the water year to date. The index is computed as the average of the six stations and is expressed in inches and in percent.

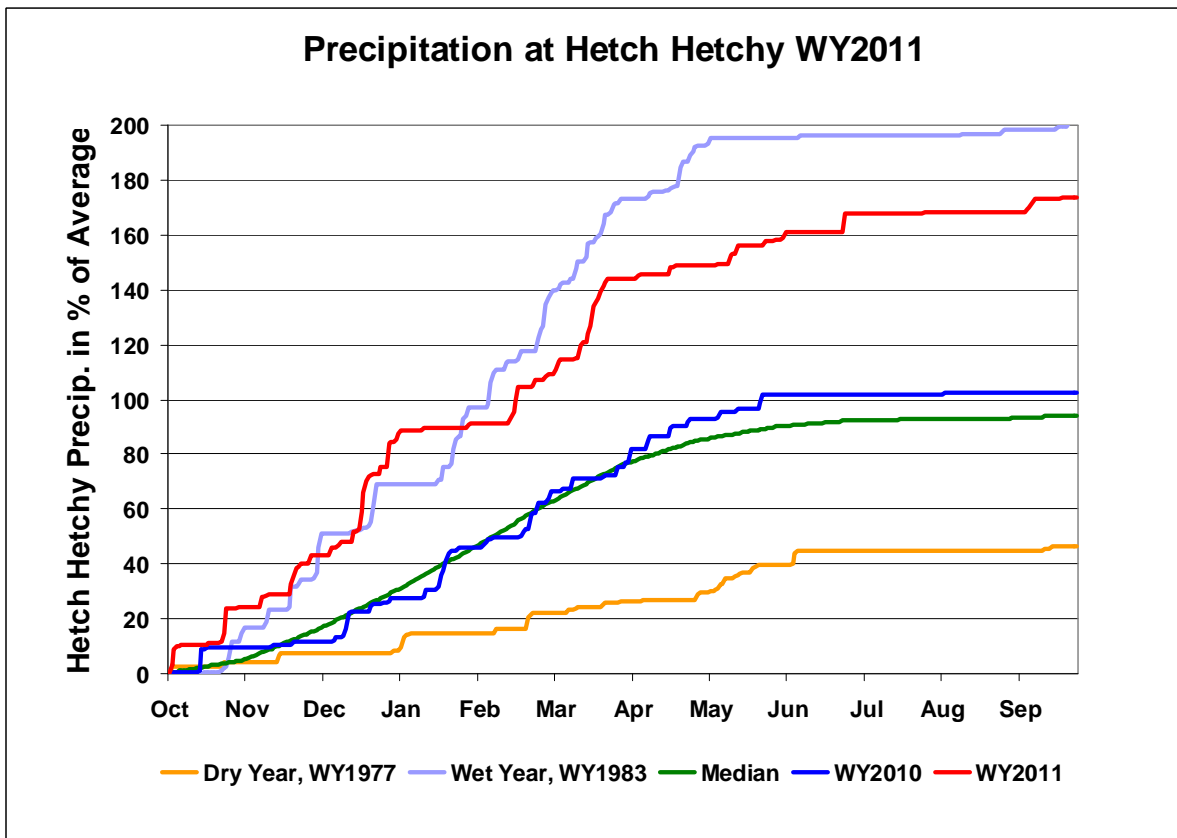


Figure 1: Water year 2011 cumulative precipitation received at Hetch Hetchy Reservoir through the end of the water year. Precipitation at the Hetch Hetchy gage for wet, dry, median, and WY 2010 are included for comparison purposes.

Tuolumne Basin Unimpaired Inflow

Unimpaired inflow to SFPUC reservoirs and the Tuolumne River at La Grange as of September 30th is summarized below in Table 2. Isolated snow patches have maintained higher than normal inflows to Hetch Hetchy, Cherry and Eleanor reservoirs.

	September 2011				October 1, 2010 through September 30, 2011			
	Observed Flow	Median ⁶	Average ⁶	Percent of Average	Observed Flow	Median ⁶	Average ⁶	Percent of Average
Inflow to Hetch Hetchy Reservoir	12,623	3,088	4,874	408.8%	1,370,448	707,627	746,990	193.7%
Inflow to Cherry Reservoir and Lake Eleanor	2,838	803	1,908	353.4%	801,997	445,914	451,510	179.9%
Tuolumne River at La Grange	25,360	7,169	11,184	353.7%	3,508,737	1,765,935	1,843,580	198.7%
Water Available to the City	0	876	0	0.0%	1,981,526	620,855	783,216	319.2%

⁶ Hydrologic Record: 1919 – 2010

Hetch Hetchy System Operations

Draft and releases from Hetch Hetchy Reservoir in September totaled 32,975 acre-feet which met SJPL deliveries, fisheries releases, and reservoir management goals.

A total of 9,511 acre-feet of power draft was made at Cherry Reservoir to manage reservoir elevation and to support the City's Municipal load, District Class 1, other loads or accounts, and sales. Pumping from Lake Eleanor resumed in late September and a total of 1,753 acre-feet of water was transferred from Lake Eleanor to Cherry Reservoir to maintain a high elevation at Cherry Reservoir and to lower Lake Eleanor for scheduled maintenance.

Local System Treatment Plant Production

The Sunol Valley Water Treatment Plant was offline for maintenance work throughout the month of September. The Harry Tracy Water Treatment Plant rate averaged 24 MGD.

Local System Water Delivery

The average water delivery rate for the month was 255 MGD, 3% less than the August rate of 262 MGD.

Local Precipitation

September dry weather prevailed across the local watersheds with the exception of a weak weather system on September 26 which produced less than a 0.1 of an inch of precipitation in the Pilarcitos watershed. The September rainfall summary is presented in Table 3.

Reservoir	Month Total (inches)	Percentage of Normal for the Month	Water Year To Date ⁷ (inches)	Percentage of Normal for the Year-to-Date ⁷
Pilarcitos	0.06	12 %	48.72	124 %
Lower Crystal Springs	0.00	0 %	30.49	113 %
Calaveras	0.00	0 %	26.07	119%

⁷ WY 2011: Oct. 2010 through Sep. 2011

Snowmelt and Water Supply

Water year 2011 brought a number of significant events during the course of the year: highest October precipitation, 5th largest snowpack on record for the Tuolumne Basin, the highest June precipitation, 2nd highest water year total precipitation, and the 5th highest water year runoff at La Grange. Inflows into Hetch Hetchy Reservoir were nearly 200% of normal water year inflow. The cool summer and deep snowpack delayed snowmelt well into July and flows on the mainstem of the Tuolumne above Hetch Hetchy on October 1st were 115 cfs as compared to 30 cfs on October 1st, 2010. These conditions combined with low water demands have left the reservoir 21 feet and 40 TAF higher than October 1st last year. Overall system storage is near the target capacity for maximizing water supply carry over conditions.

With such an eventful water year 2011 – what will water year 2012 bring? Climatic indices such as El Nino and the Pacific Decadal Oscillation do not bring certainty to long term weather and

climate forecasts for the Sierra. What we do know is that La Nina conditions are setting up once again in sea surface temperatures. The array of models has begun to predict strengthening La Nina conditions, similar to last year. This does not infer that the Sierra will have another epic precipitation year, but it does increase the likeliness that temperatures can be on the cooler side and storms can be on the colder side as well.

Early October has brought the first significant storm event to the Sierra, with snowfall down to ~6500 feet. Snowfall in the Sierras during the first week of October has been an occurrence for the past 3 years. Over the next few days the weather will continue to clear and slowly return to seasonal temperatures. The National Weather Service Climate Prediction Center indicates an equal chance for above or below normal temperatures and precipitation in the 3-month outlook.

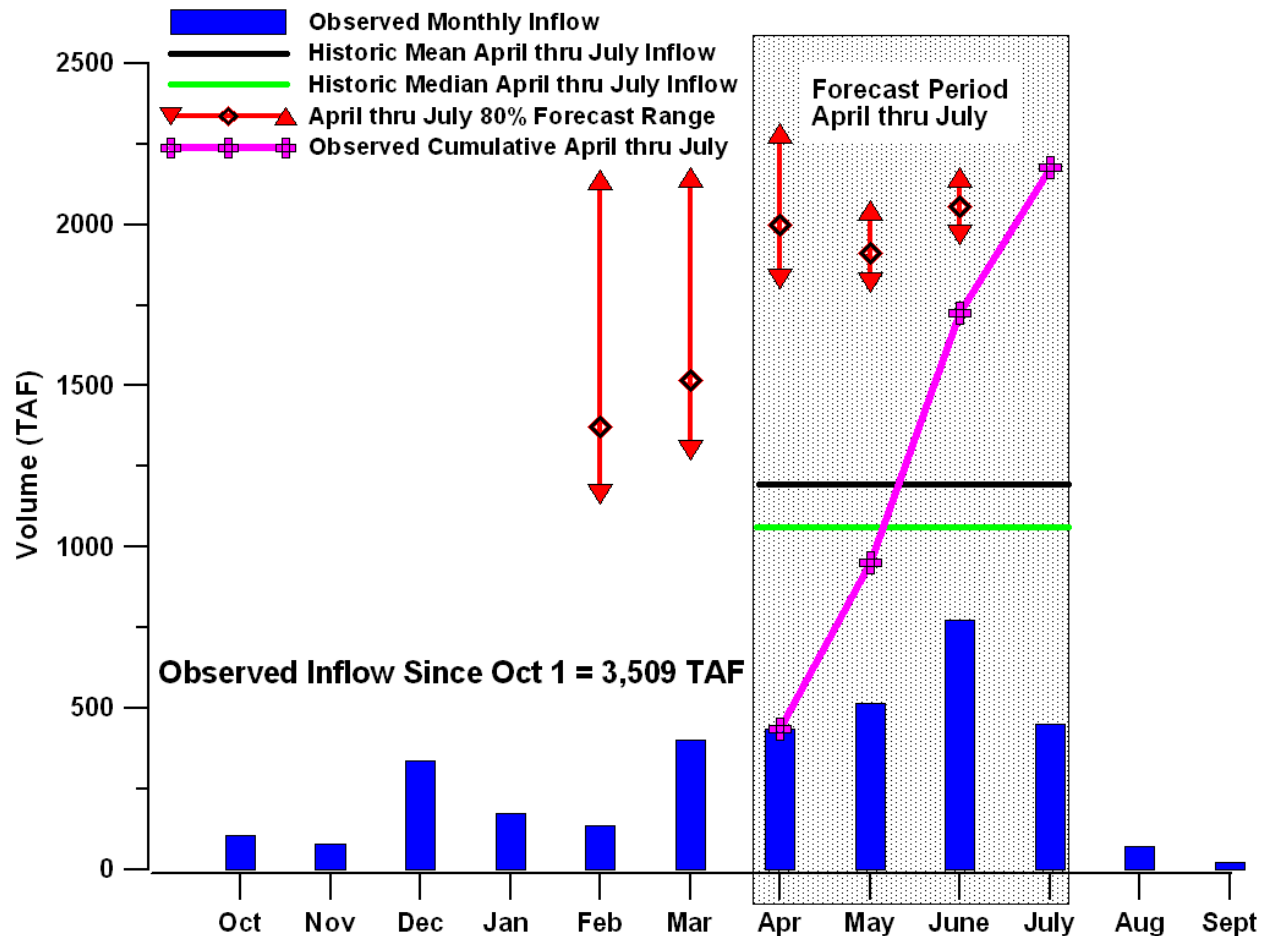


Figure 2: Water Year conditions for the Tuolumne River at La Grange and for the 80% water supply forecast range (triangles represent the 90% and 10% forecasts, the open diamond represents the median forecast).

Due to typical low flows during the fall, no water became available to the City in September, which is typical in late summer. The total water available to the City for water year 2011 remained at 1,981,526 acre-feet (Figure 3).

Unimpaired Flow at La Grange & Water Available to the City

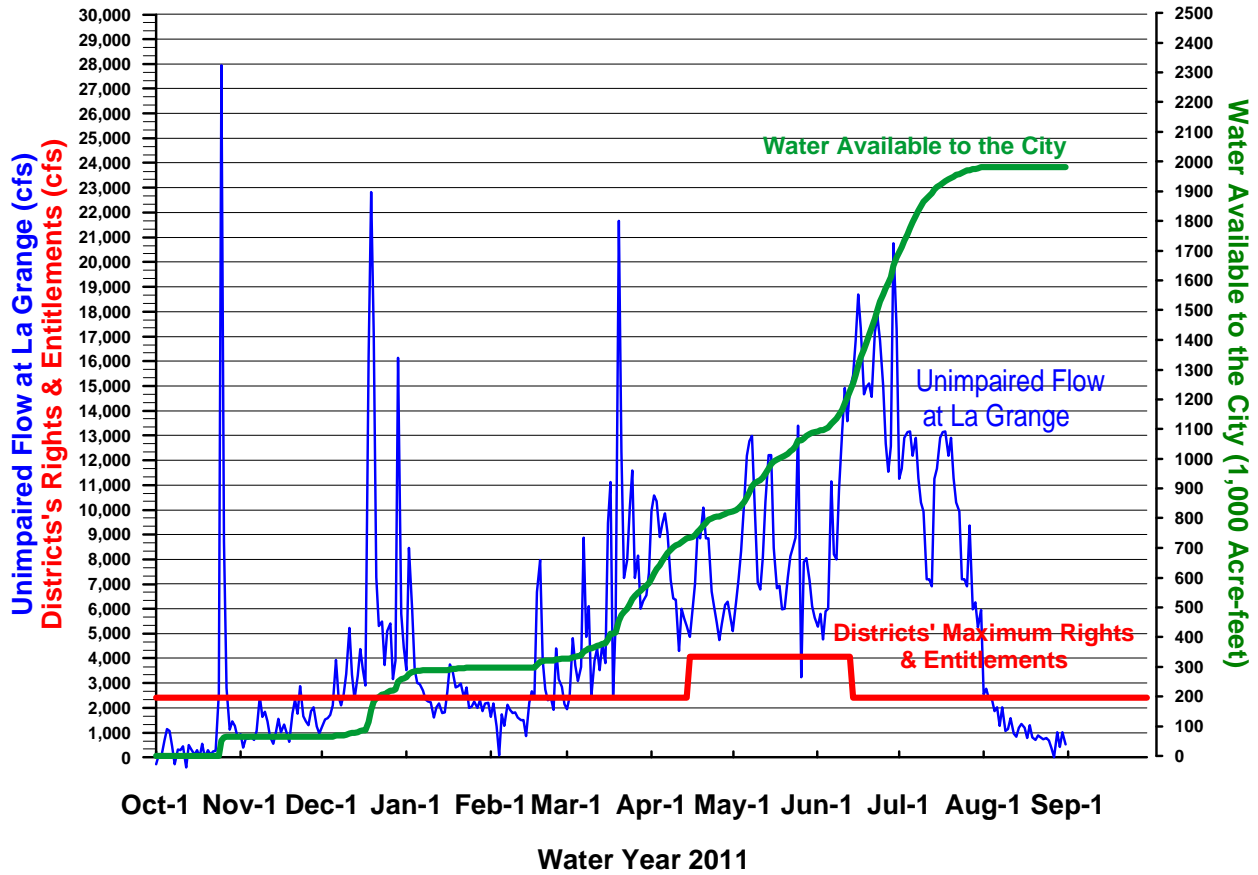


Figure 3: Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City. Water available to the City for the period from October 1st, 2010 through September 30th, 2011 was 1,981,526 acre-feet.

cc	HHWP Records	Dufour, Alexis	Jue, Tyrone	Ramirez, Tim
	Briggs, David	Gibson, Bill	Kehoe, Paula	Ritchie, Steve
	Cameron, David	Griffin, Pat	Levin, Ellen	Rydstrom, Todd
	Carlin, Michael	Hale, Barbara	Mazurkiewicz, Adam	Samii, Camron
	Chester, John	Hannaford, Margaret	Meier, Steve	Sandkulla, Nicole
	DeGraca, Andrew	Harrington, Ed	Nelson, Kent	Tsang, Michael
	Dhakal, Amod	Jensen, Art	Patterson, Mike	Williams, Mike