

San Francisco Public Utilities Commission Hydrological Conditions Report May 2018

J. Chester, C. Graham, & N. Waelty, June 8, 2018



Moccasin Powerhouse and Penstocks

System Storage

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

Table 1 Current Storage As of June 1, 2018							
Reservoir	Current Storage		Maximum Storage		Available Capacity		Percentage of Maximum Storage
	Acre-Feet	Millions of Gallons	Acre-Feet	Millions of Gallons	Acre-Feet	Millions of Gallons	
Tuolumne System							
Hetch Hetchy ¹	351,915		360,360		8,445		98%
Cherry ²	233,074		268,810		35,736		87%
Eleanor ³	26,533		27,100		567		98%
Water Bank	633,061		676,173		43,112		94%
Tuolumne Storage	1,244,583		1,332,443		87,860		93%
Local Bay Area Storage							
Calaveras ⁴	24,575	8,008	96,824	31,550	72,249	23,542	25%
San Antonio	47,905	15,610	50,496	16,454	2,591	844	95%
Crystal Springs	53,200	17,335	58,377	19,022	5,176	1,687	91%
San Andreas	16,455	5,362	18,996	6,190	2,541	828	87%
Pilarcitos	2,837	924	2,995	976	158	51	95%
Total Local Storage	144,972	47,239	227,688	74,192	82,715	26,953	64%
Total System	1,389,555		1,560,131		170,575		89%

¹ Maximum Hetch Hetchy Reservoir storage with drum gates activated.

² Maximum Cherry Lake storage with flash-boards removed.

³ Maximum Lake Eleanor storage with flash-boards installed.

⁴ Available capacity does not take into account current DSOD storage restrictions.

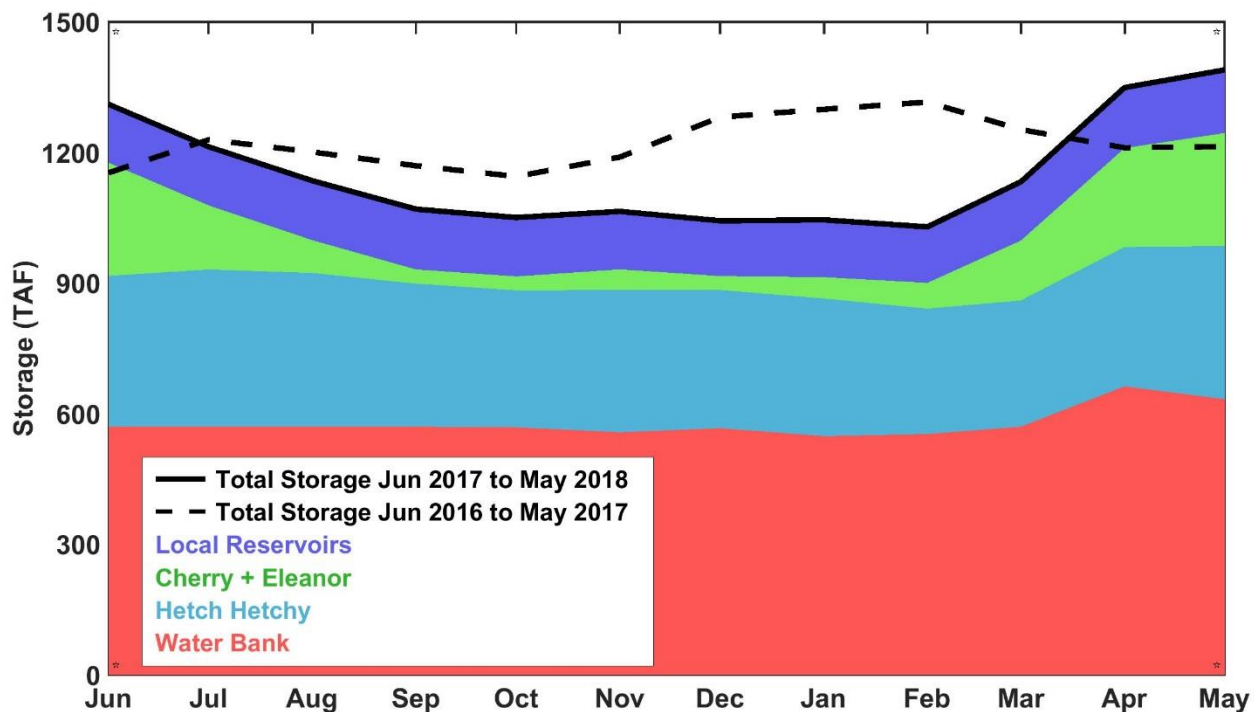


Figure 1: Monthly system storage for past 12 months in thousand acre-feet (TAF). Color bands show relative contributions to total system storage. Solid black line shows total system storage for the past 12 months. Dashed black line shows total system storage the previous 12 months.

Hetch Hetchy System Precipitation Index ^{5/}

Current Month: The May 2018 six-station precipitation index was 0.31 inches, or 23% of the average index for the month.

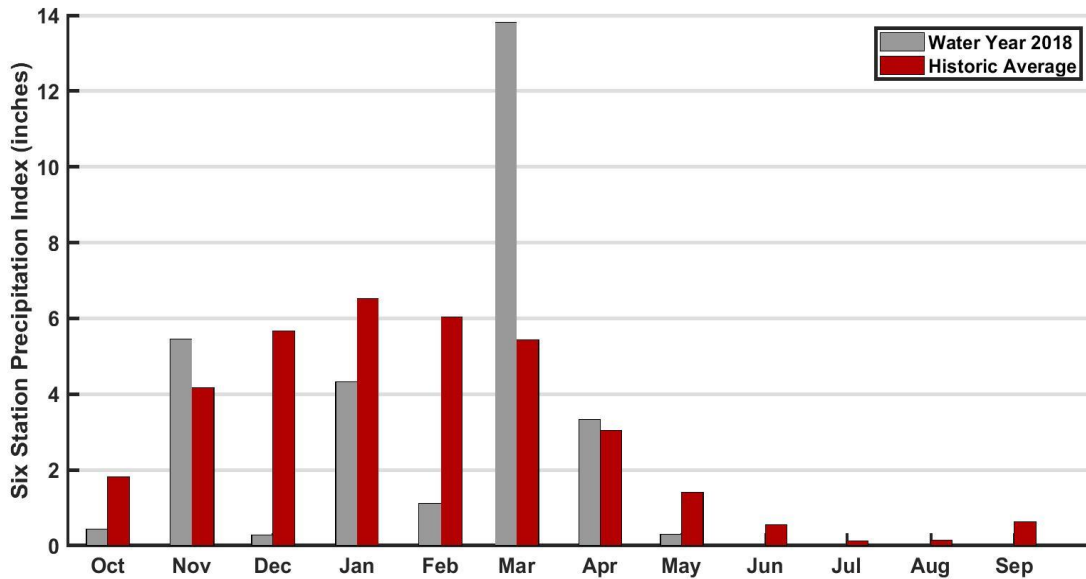


Figure 2: Monthly distribution of the Hetch Hetchy six-station precipitation index as percent of the annual average precipitation, as of May 1, 2018.

Cumulative Precipitation to Date: As of June 1, the six-station precipitation index for water year 2018 was 28.75 inches, which is 81% of the average annual water year total. Hetch Hetchy received 0.18 inches precipitation in May, for a total of 31.96 inches for Water Year 2018. The cumulative Hetch Hetchy precipitation is shown in Figure 3 in red.

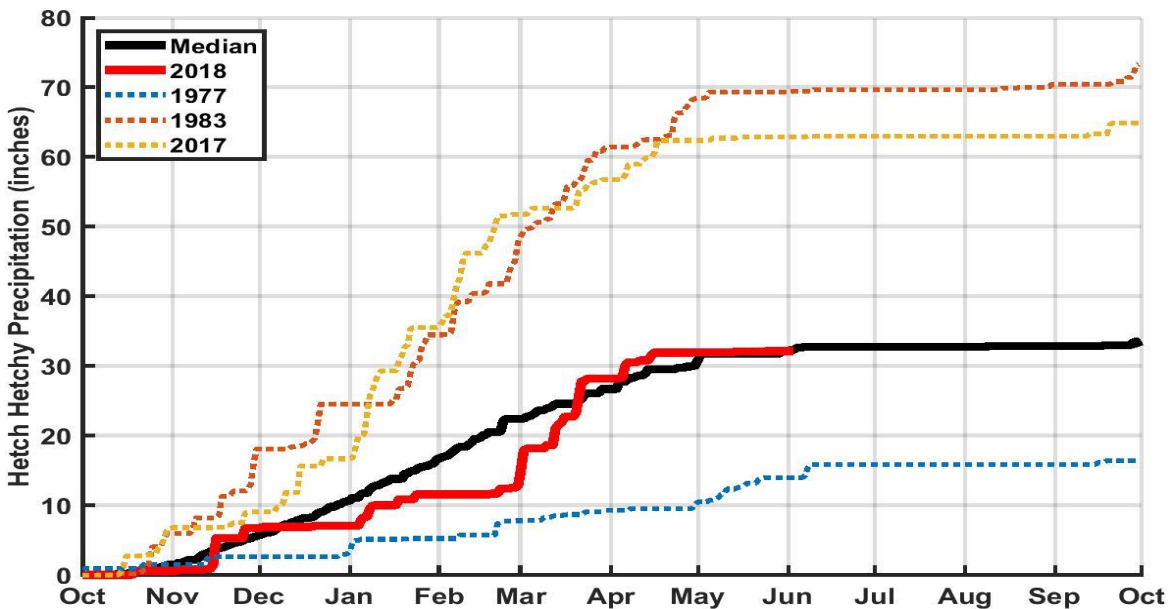


Figure 3: Water year 2018 cumulative precipitation measured at Hetch Hetchy Reservoir through June 1, 2018. Precipitation at the Hetch Hetchy gauge for wet, dry, median, and WY 2017 are included for comparison purposes.

^{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.

Tuolumne Basin Unimpaired Inflow

Unimpaired inflow to SFPUC reservoirs and the Tuolumne River at La Grange as of June 1, 2018 is summarized below in Table 2.

*All flows are in acre feet	May 2018				October 1, 2017 through May 31,2018			
	Observed Flow	Median ⁶	Mean ⁶	Percent of Mean	Observed Flow	Median ⁶	Mean ⁶	Percent of Mean
Inflow to Hetch Hetchy Reservoir	200,495	215,683	217,400	92%	528,053	441,643	439,322	120%
Inflow to Cherry Lake and Lake Eleanor	85,474	120,337	122,089	70%	379,170	326,141	334,049	114%
Tuolumne River at La Grange	347,476	447,661	441,896	79%	1,450,280	1,184,419	1,317,235	110%
Water Available to City	98,630	198,767	208,051	47%	657,281	433,036	527,964	124%

⁶Hydrologic Record: 1919 – 2015

Hetch Hetchy System Operations

Power draft and releases from Hetch Hetchy Reservoir during the month of May totaled 175,254 acre-feet. Precipitation as of June 1st results in a water year Type A for Hetch Hetchy Reservoir through July 1st, 2018. Hetch Hetchy minimum instream release requirements for May were 100 cfs, and for June are 125 cfs. Hetch Hetchy Reservoir is expected to fill the second week of June, with water available for power generation through the end of runoff. Hetch Hetchy inflows are currently being managed via power draft and valve releases.

Power draft and valve releases from Cherry Lake totaled 45,047 acre-feet during the month of May. The required minimum instream release from Cherry Lake is 5 cfs through June 30th, 2018. Required minimum release from Lake Eleanor (due to pumping) is 20 cfs through September 15th. Transfer from Lake Eleanor to Cherry Lake will occur on and off throughout the runoff season.

Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant average production rate for May was 34 MGD. The Sunol Valley Water Treatment Plant production for the month was 17 MGD.

Local System Water Delivery

The average May delivery rate was 211 MGD which is a 15% increase over the April delivery rate of 184 MGD.

Local Precipitation

Dry and seasonably cool conditions persisted throughout the month, below normal rainfall was recorded at all watershed gages. The rainfall summary for May is presented in Table 3.

Reservoir	Month Total (inches)	Percentage of Average for the Month	Water Year to Date ⁷ (inches)	Percentage of Average for the Year-to-Date ⁷
Pilarcitos	0.27	23 %	28.97	79 %
Lower Crystal Springs	0.15	21 %	19.77	76 %
Calaveras	0.00	0 %	14.03	67 %

⁷ WY 2018: Oct. 2017 through Sep. 2018.

Snowmelt and Water Supply

The snowpack as measured by the upcountry snow pillows has melted out (Figure 4). The NASA Airborne Snow Observatory flew over the Tuolumne Basin above Hetch Hetchy on May 28, measuring 120 TAF snow still on the ground. Previous years' experience indicates that most of the water seen as snow on the ground will become inflow to our reservoirs. 120 TAF inflows match our internal models for expected Hetchy inflows for the remainder of runoff.

Inflows have peaked at all upcountry reservoirs as warm weather has melted the snowpack. Hetch Hetchy Reservoir storage remains within seasonal targets. The current seasonal inflow forecast projects Hetch Hetchy Reservoir will finish spill late June, with additional water being utilized for power generation until the end of runoff. At Cherry Lake, storage is nearing our seasonal targets, and we have been drafting water for power generation. Lake Eleanor is full and will spill through June. Total system storage is near 89% as the upcountry reservoirs are maintained at the seasonal targets. Water Bank is full and projected to debit throughout June as the reservoirs fill.

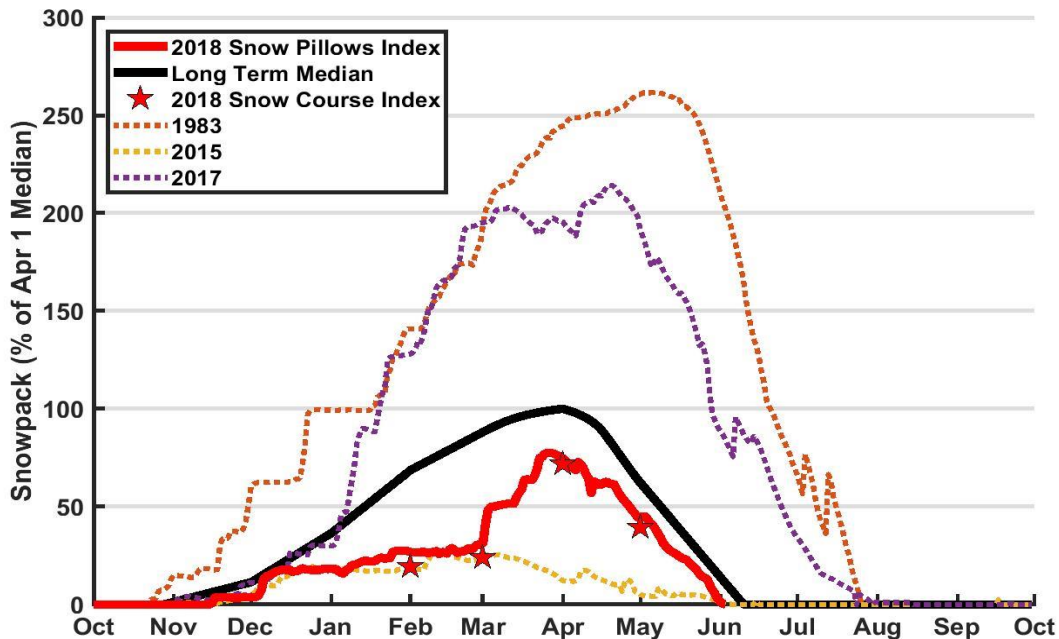


Figure 4: Tuolumne Snow Pillow and Snow Course Indices..

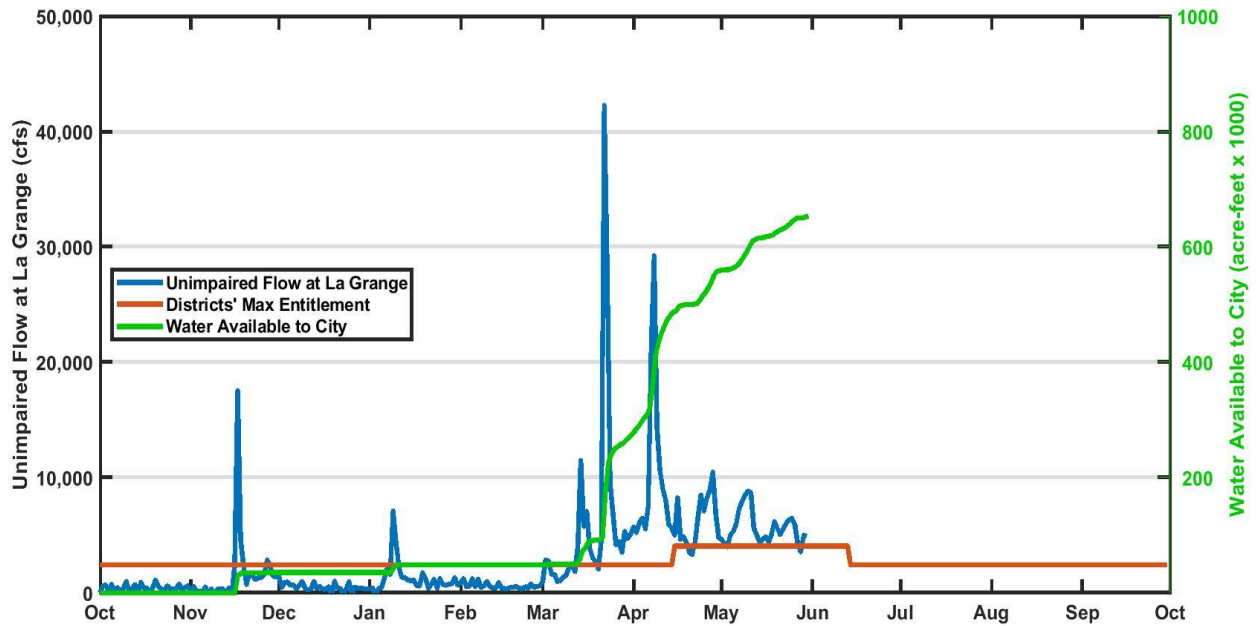


Figure 5: Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City. Current Water Available to the City is 657,281 acre-feet in WY2018.

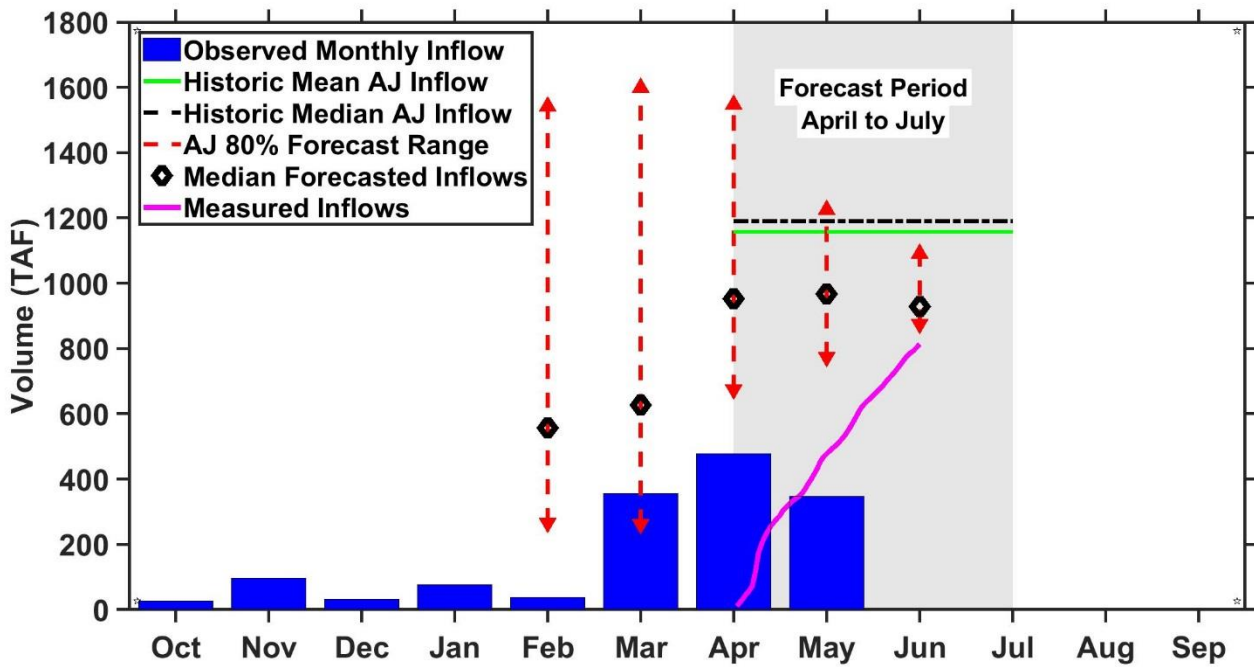


Figure 6: Water year 2018 conditions for the Tuolumne River at La Grange and for the 80% water supply forecast range (triangles represent the 90% and 10% forecasts, the open diamond represents the median forecast). A below average May, precipitation wise, leads to a small lowering of the median inflow forecast, and a significant tightening of the forecast range.