

# San Francisco Public Utilities Commission

## Hydrological Conditions Report

### August 2018

J. Chester, C. Graham, N. Waelty, & R. Walters, Sept 5, 2018



The Lyell Fork of the Tuolumne River meandering through Lyell Canyon. Fed by the Lyell Glacier, the Lyell Fork is the headwater of the Tuolumne River.

## System Storage

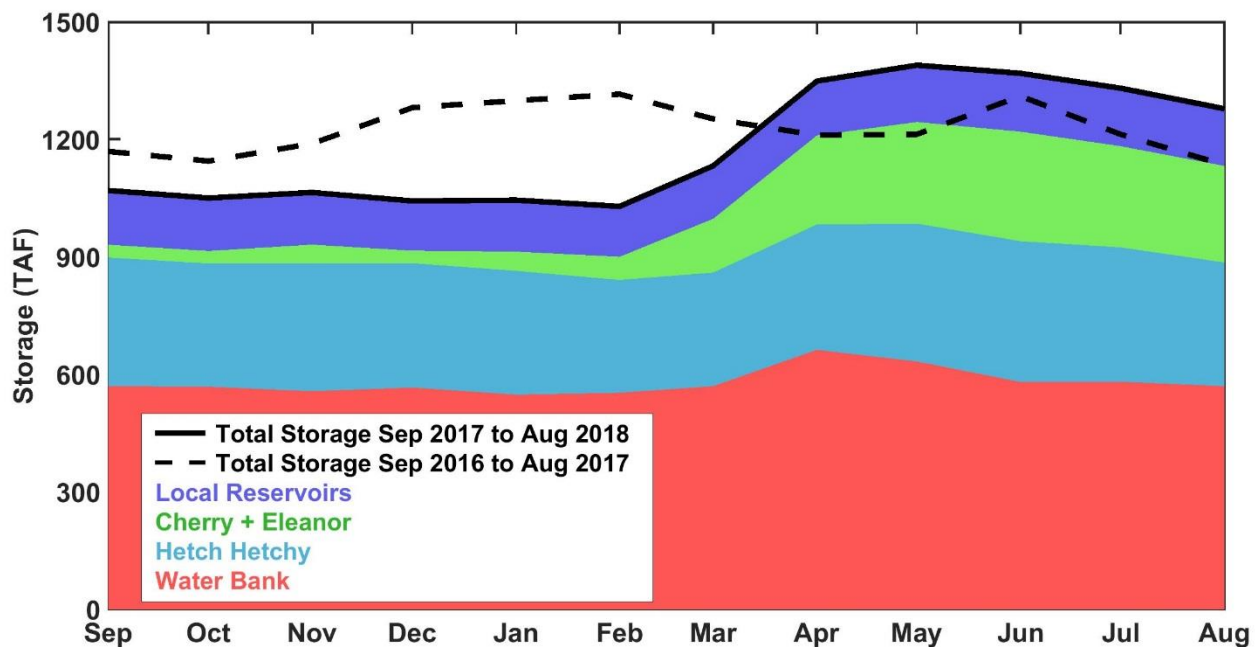
Current Tuolumne System and Local Bay Area storage conditions are summarized in Table 1.

<b>Table 1 Current Storage As of September 1, 2018</b>							
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	
<b>Tuolumne System</b>							
Hetch Hetchy <sup>1</sup>	315,822		360,360		44,538		88%
Cherry <sup>2</sup>	224,053		268,810		44,757		83%
Eleanor <sup>3</sup>	22,425		27,100		4,675		83%
Water Bank	570,000		570,000		0		100%
Tuolumne Storage	1,132,300		1,226,270		93,970		92%
<b>Local Bay Area Storage</b>							
Calaveras <sup>5</sup>	23,647	7,705	96,824	31,550	73,177	23,845	24%
San Antonio	48,149	15,689	50,496	16,454	2,346	765	95%
Crystal Springs	54,129	17,638	58,377	19,022	4,247	1,384	93%
San Andreas	17,628	5,744	18,996	6,190	1,369	446	93%
Pilarcitos	2,511	818	2,995	976	484	158	84%
Total Local Storage	146,064	47,595	227,688	74,192	81,623	26,597	64%
<b>Total System</b>	<b>1,278,364</b>		<b>1,453,957</b>		<b>175,593</b>		<b>88%</b>

<sup>1</sup> Maximum Hetch Hetchy Reservoir storage with drum gates activated.

<sup>2</sup> Maximum Cherry Lake storage with flash-boards removed.

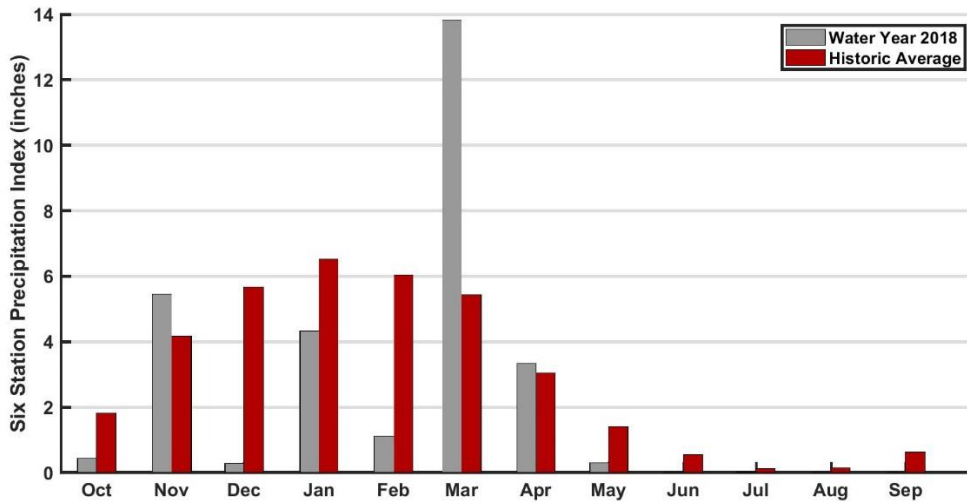
<sup>3</sup> Maximum Lake Eleanor storage with flash-boards installed.



**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.

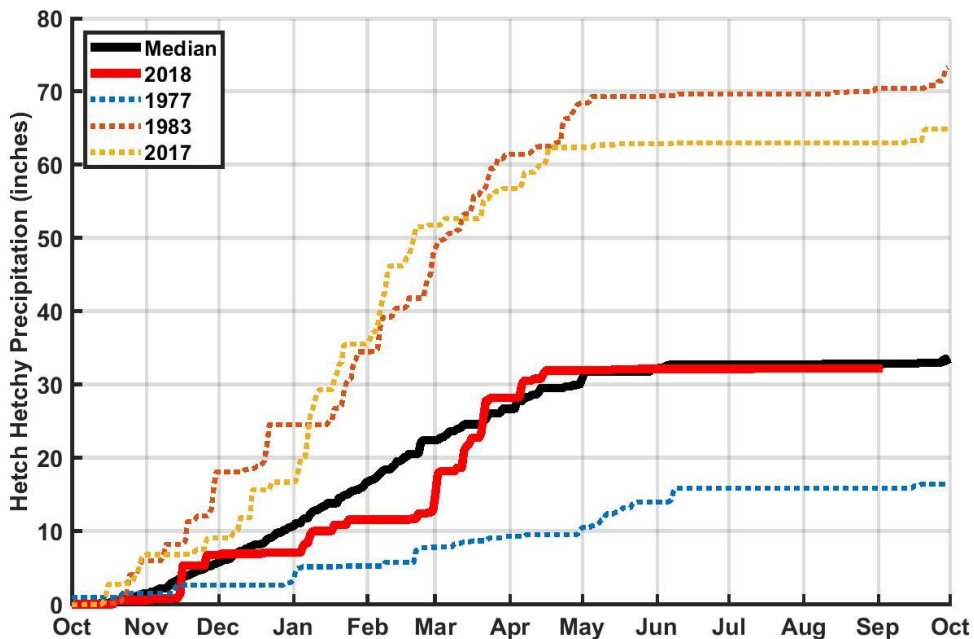
## Hetch Hetchy System Precipitation Index<sup>6</sup>

*Current Month:* The August 2018 six-station precipitation index was 0.00 inches, or 0% 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 September 1, 2018.

*Cumulative Precipitation to Date:* As of September 1<sup>st</sup>, the six-station precipitation index for Water Year 2018 was 29.11 inches, which is 82% of the average annual water year total, or 83% of the average season-to-date precipitation. Hetch Hetchy received 0.00 inches of precipitation in August, for a total of 32.25 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 September 1, 2018. Precipitation at the Hetch Hetchy gauge for wet, dry, median, and WY 2017 are included for comparison purposes.

<sup>6</sup>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 September 1, 2018 is summarized below in Table 2.

*All flows are in acre feet	August 2018				October 1, 2017 through August 31, 2018			
	Observed Flow	Median <sup>7</sup>	Mean <sup>7</sup>	Percent of Mean	Observed Flow	Median <sup>7</sup>	Mean <sup>7</sup>	Percent of Mean
Inflow to Hetch Hetchy Reservoir	4,304	7,010	13,803	31%	646,500	699,972	732,224	88%
Inflow to Cherry Lake and Lake Eleanor	-1,678	1,654	3,225	-52%	408,074	442,832	450,150	91%
Tuolumne River at LaGrange	21,205	15,869	24,562	86%	1,660,264	1,670,349	1,803,156	92%
Water Available to City	0	0	1,375	0%	666,636	580,260	764,469	87%

<sup>7</sup>Hydrologic Record: 1919 – 2015

<sup>8</sup>Negative inflows are due to uncertainties in evaporation, flows and reservoir rating curves

## Hetch Hetchy System Operations

Power draft and stream releases from Hetch Hetchy Reservoir during the month of August totaled 31,373 acre-feet. Total inflows as of September 1<sup>st</sup> results in a Water Year Type A (normal to wet conditions) for Hetch Hetchy Reservoir through January 1<sup>st</sup>, 2019. This year type is based on accumulated runoff from October 1<sup>st</sup>, 2017 through August 31<sup>st</sup>, 2018. Hetch Hetchy minimum instream release requirements for August were 125 cfs, and for September are 100 cfs until September 15<sup>th</sup> at which point they will decrease to 80 cfs. Current Hetch Hetchy releases are equal to minimum environmental releases and water deliveries to the City.

Power draft and valve releases from Cherry Lake totaled 9,804 acre-feet during the month of August. The required minimum instream release from Cherry Lake is 15 cfs through September 30<sup>th</sup>, 2018. Required minimum release from Lake Eleanor (due to pumping) is 20 cfs through September 15<sup>th</sup> after which it drops to 10 cfs. Transfer from Lake Eleanor to Cherry Lake ended on June 25.

## Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant average production rate for August was 29 MGD. The Sunol Valley Water Treatment Plant was on standby for the month and no water production occurred.

## Local System Water Delivery

The average August delivery rate was 237 MGD which is less than a 1% decrease below the July delivery rate of 238 MGD.

## Local Precipitation

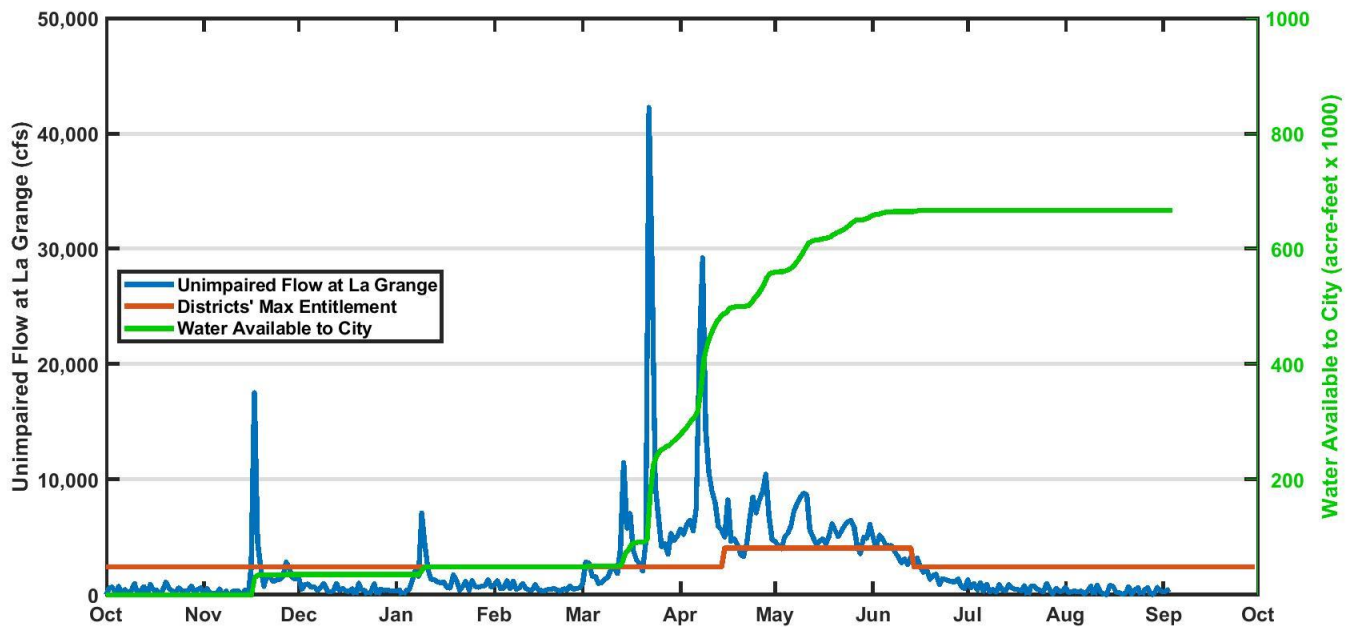
Seasonably dry conditions characterized the month's weather. The rainfall summary for August is presented in Table 3.

Reservoir	Month Total (inches)	Percentage of Average for the Month	Water Year to Date <sup>9</sup> (inches)	Percentage of Average for the Year-to-Date <sup>9</sup>
Pilarcitos	0.01	13 %	29.03	78 %
Lower Crystal Springs	0.00	0 %	19.78	76 %
Calaveras	0.00	0 %	14.03	66 %

<sup>9</sup> WY 2018: Oct. 2017 through Sep. 2018.

## Water Supply

Inflows at all upcountry reservoirs continued to recede throughout the month of August. Hetch Hetchy Reservoir storage remains within seasonal targets and is drafting according to instream and water delivery demands. At Cherry Lake, storage is near the seasonal target with recreational releases concluding after Labor Day. Total Tuolumne system storage is at 92%. Water Bank was full throughout August and its maximum value reset back to 570,000 acre-feet after Don Pedro receded below flood storage targets on August 5<sup>th</sup>. SFPUC releases in excess of unimpaired flows at LaGrange resulted in a saturation, or “spilling” of Water Bank, which is expected to remain full or near full throughout the remainder of the water year.



**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 666,636 acre-feet in WY2018.