

# San Francisco Public Utilities Commission Hydrological Conditions Report for October 2017

J. Chester, C. Graham, & N. Waelty, November 17, 2017



Priest and Moccasin Reservoirs have bypass capabilities. Under normal operations, neither bypass is in use. One or both can be used with no impact on delivery capacity in case of water quality or operational concerns.

At Priest (above), the bypass allows water from Mountain Tunnel to directly enter Moccasin Power Tunnel without contact to Priest Reservoir. In this photo, we are refilling Priest Reservoir via water being released from the Priest Flapgates while simultaneously delivering water to Moccasin via the bypass.

At Moccasin (below), one bypass transmits Moccasin Creek water underneath the reservoir, keeping Moccasin Creek water separated from Hetch Hetchy water delivered to the city. A second bypass can transmit Hetchy water directly from Moccasin Powerhouse to Foothill Tunnel, in case of water quality or operational concerns at Moccasin Reservoir.

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

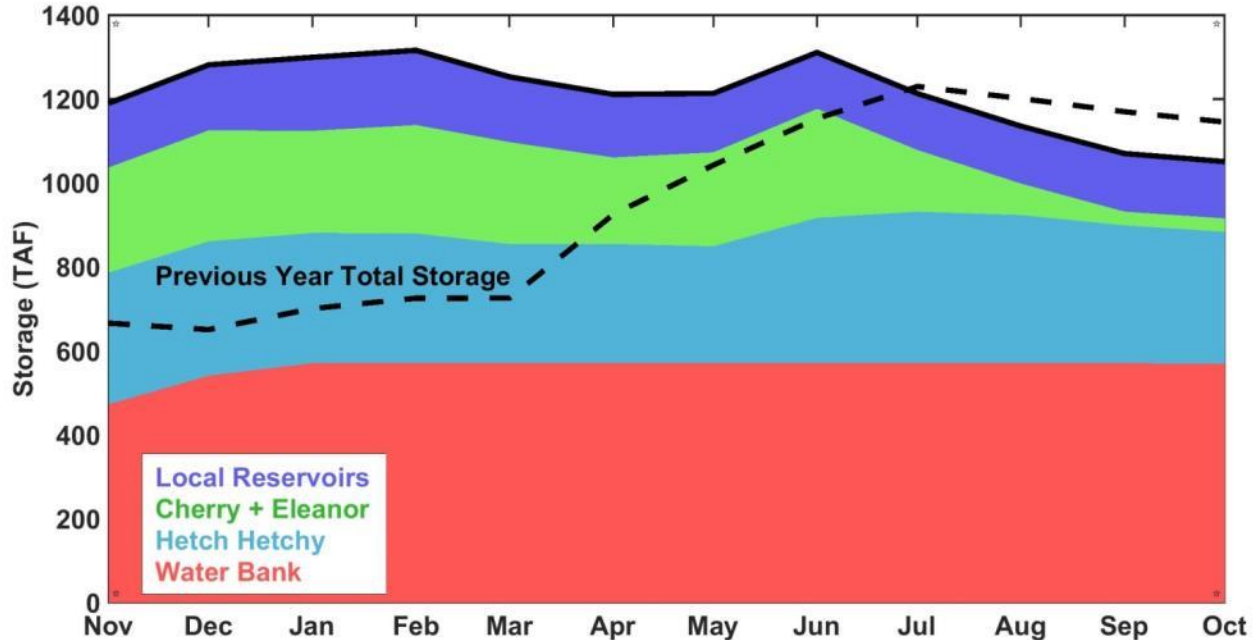
Reservoir	Current Storage		Maximum Storage		Available Capacity		Percentage of Maximum Storage
	Acre-Feet	Millions of Gallons	Acre-Feet	Millions of Gallons	Acre-Feet	Millions of Gallons	
<b>Tuolumne System</b>							
Hetch Hetchy <sup>1</sup>	314,694		340,000		25,306		92.6%
Cherry <sup>2</sup>	5,609		268,810		263,201		2.1%
Eleanor <sup>3</sup>	26,436		26,416		0		100.0%
Water Bank	568,473		570,000		1,527		99.7%
Tuolumne Storage	915,212		1,205,226		290,034		75.9%
<b>Local Bay Area Storage</b>							
Calaveras <sup>4</sup>	27,178	8,856	96,824	31,550	69,646	22,694	28.1%
San Antonio	38,181	12,441	50,496	16,454	12,315	4,013	75.6%
Crystal Springs	49,668	16,184	58,377	19,022	8,709	2,838	85.1%
San Andreas	18,390	5,992	18,996	6,190	606	198	96.8%
Pilarcitos	1,836	598	2,995	976	1,159	378	61.3%
Total Local Storage	135,252	44,072	227,688	74,192	92,435	30,120	59.4%
<b>Total System</b>	<b>1,050,464</b>		<b>1,432,914</b>		<b>382,469</b>		<b>73.3%</b>

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

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

<sup>3</sup> Maximum Lake Eleanor storage with 3 of 4 rows of flash-boards installed.

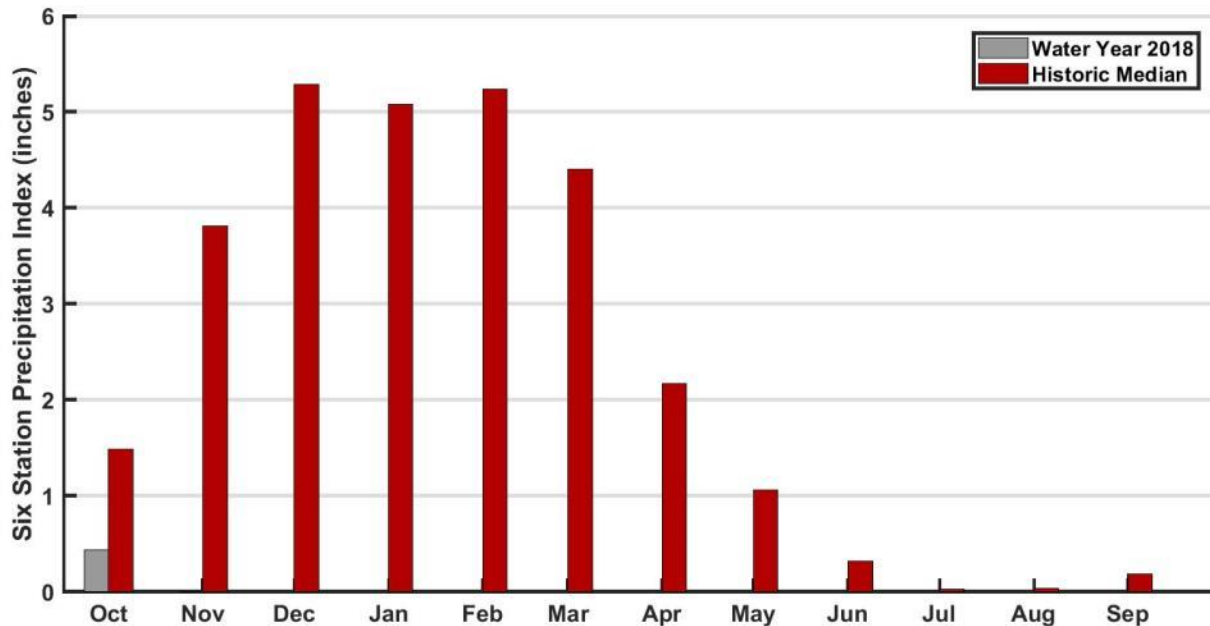
<sup>4</sup> Available capacity does not take into account current DSOD storage restrictions.



**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.

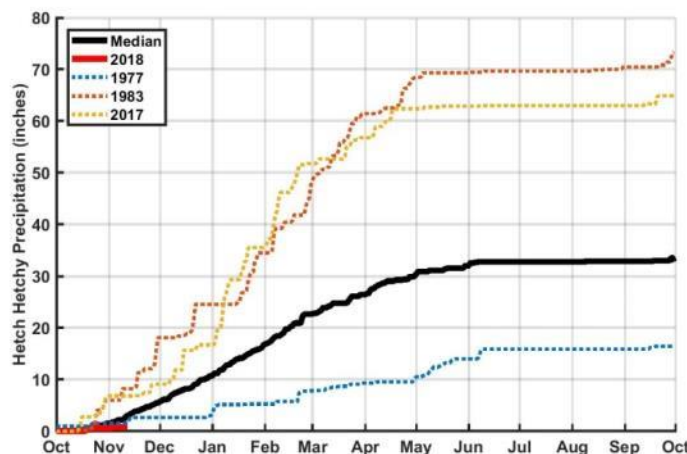
## Hetch Hetchy System Precipitation Index <sup>5/</sup>

*Current Month:* The October 2017 six-station precipitation index was 0.44 inches, or 24% 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 November 1.

*Cumulative Precipitation to Date:* The accumulated six-station precipitation index for water year 2018 is 0.75 inches, which is 2% of the average annual water year total. Hetch Hetchy received 0.59 inches precipitation in October, and 0.26 inches in the first 2 weeks of November for a total of 0.85 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 November 14<sup>th</sup>, 2017. Precipitation at the Hetch Hetchy gauge for wet, dry, median, and WY 2017 are included for comparison purposes.

<sup>5/</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 November 1, 2017 is summarized below in Table 2.

<b>Table 2</b>				
<b>WY 2018 Calculated reservoir inflows and Water Available to City</b>				
<b>As of November 1, 2017</b>				
*All volumes are in acre feet	<b>October 2017</b>			
	<b>Observed Flow</b>	<b>Median<sup>6</sup></b>	<b>Mean<sup>6</sup></b>	<b>Percent of Mean</b>
Inflow to Hetch Hetchy Reservoir	5,193	3,161	6,199	83.8%
Inflow to Cherry Lake and Lake Eleanor	2,668	2,329	5,537	48.2%
Tuolumne River at La Grange	26,327	10,018	17,351	151.7%
Water Available to City	0	0	2,583	0.0%

<sup>6</sup>Hydrologic Record: 1919 – 2015

### Hetch Hetchy System Operations

Power draft and releases from Hetch Hetchy Reservoir during the month of October totaled 24,783 acre-feet to meet instream release requirements. Inflows to date are sufficient to keep Hetch Hetchy Reservoir in Year Type A through January, 2018. Hetch Hetchy minimum instream release requirements for October and November are 60 cfs.

9,318 acre-feet of power draft and valve releases was made from Cherry Lake during the month of October to meet instream release requirements and facilitate lowering of Cherry Lake for valve work. No water was transferred via pumping from Lake Eleanor to Cherry Lake in October. The required minimum instream release from Cherry Lake is 5 cfs through June 30<sup>th</sup>, 2018. Required minimum release from Lake Eleanor is 5 cfs through March 1<sup>st</sup>. Lake Eleanor is currently nearly full, with releases targeting minimum instream release requirements.

### Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant average production rate for October was 35 MGD. The Sunol Valley Water Treatment Plant production for the month was 6 MGD.

### Local System Water Delivery

The average October delivery rate was 219 MGD which is a 9% decrease below the September delivery rate of 240 MGD.

## Local Precipitation

Dry weather persisted through October with one rain event mid-month. The October rainfall summary is presented in Table 3.

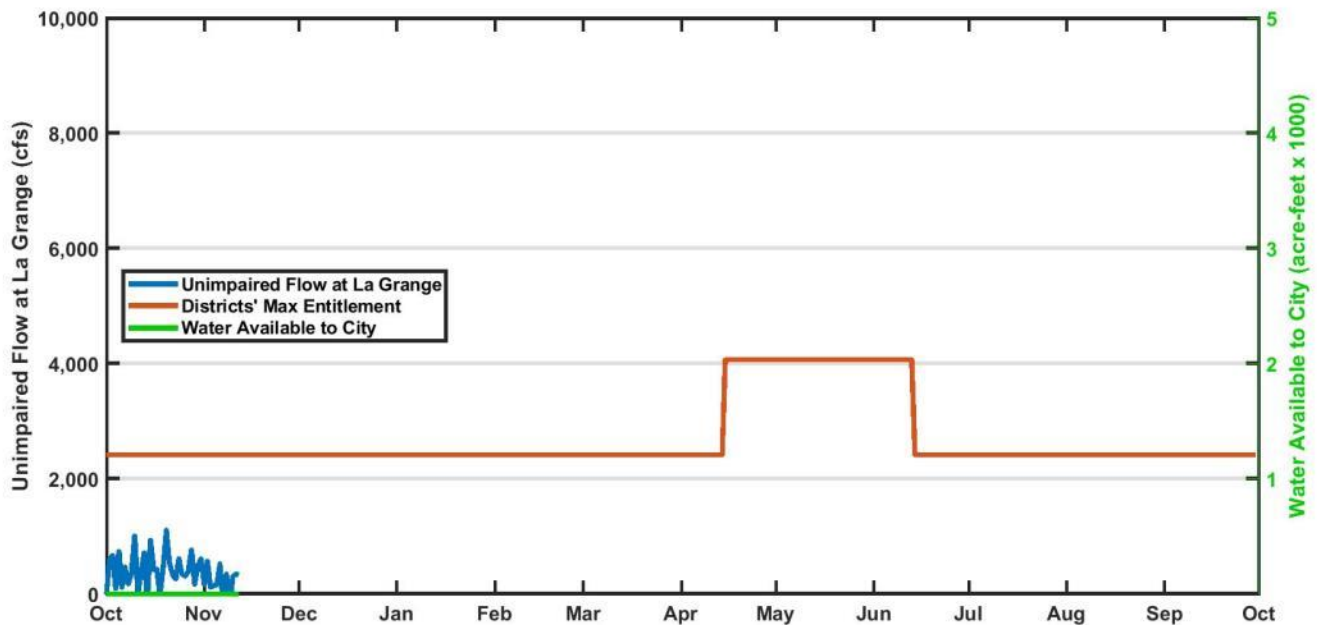
Reservoir	Month Total (inches)	Percentage of Average for the Month	Water Year to Date <sup>7</sup> (inches)	Percentage of Average for the Year-to-Date <sup>7</sup>
Pilarcitos	0.61	27 %	0.61	61 %
Lower Crystal Springs	0.32	22 %	0.32	32 %
Calaveras	0.36	32 %	0.36	36 %

<sup>7</sup> WY 2018: Oct. 2017 through Sep. 2018.

## Snowmelt and Water Supply

Cherry Lake has been lowered to 5,000 acre-feet (5 TAF) for outlet valve repairs and replacement. This is the minimum target, and Cherry Lake is expected to slowly refill while repairs are being made. Butterfly valve repair work scheduled to be completed in late December, allowing for lake refilling throughout the winter. The hollow jet replacement scheduled to be completed in late January, allowing for return to normal operations at Cherry Lake. Lake Eleanor is being kept at maximum storage. Water from Lake Eleanor will be transferred to Cherry Lake as soon as construction allows, which may be as early as late-December.

A pair of November storms resulted in significant inflows to all reservoirs. Both storms were warm, resulting in rain rather than snow. No significant snowpack has accumulated at this date.



**Figure 4:** Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City. No water was available to the City so far during Water Year 2018.