

# San Francisco Public Utilities Commission

## Hydrological Conditions Report

### April 2020

J. Chester, C. Graham, N. Waelty, May 6, 2020



HHWP Water and Power Planning staff and Turlock Irrigation District staff participate in the Cherry Creek Basin snow survey in late April 2020. The California Cooperative Snow Survey program, established in 1929, is a partnership of more than 50 state, federal and private agencies.

## System Storage

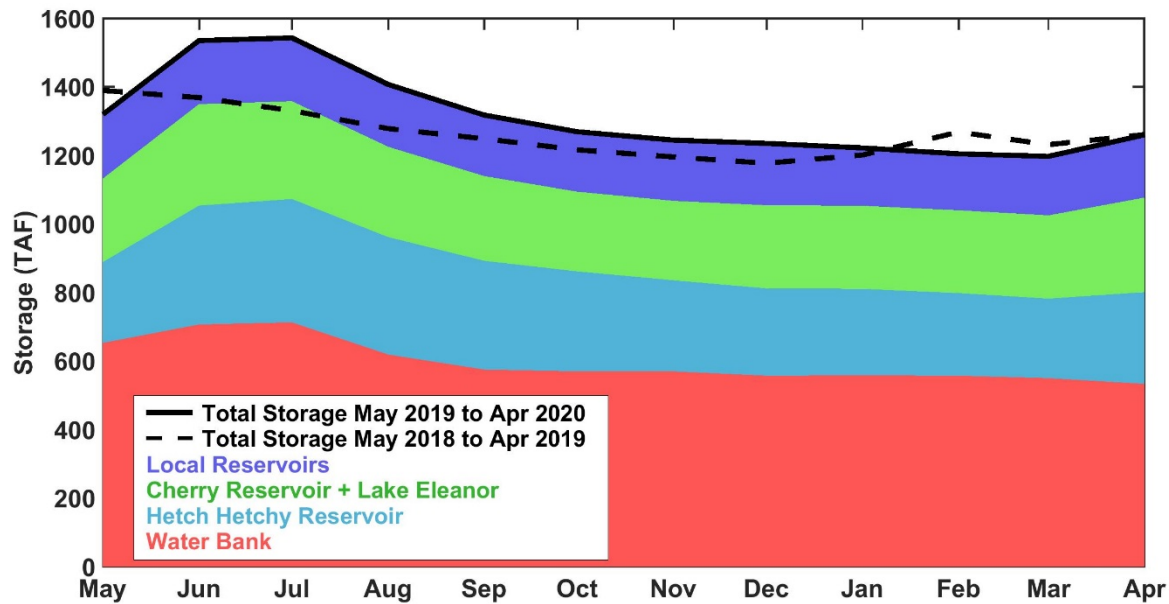
Current Tuolumne System and Local Bay Area storage conditions are summarized in Table 1.

Table 1 Current System Storage as of May 1, 2020							
	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 Reservoir <sup>1</sup>	267,662		360,360		92,698		74%
Cherry Reservoir <sup>2</sup>	250,373		275,340		24,967		91%
Lake Eleanor <sup>3</sup>	25,681		27,100		1,419		95%
Water Bank	533,473		570,000		49,693		94%
Tuolumne Storage	1,077,189		1,232,800		168,777		87%
Local Bay Area Storage							
Calaveras Reservoir	65,285	21,273	96,824	31,550	31,539	10,277	67%
San Antonio Reservoir	45,707	14,894	50,496	16,454	4,789	1,561	91%
Crystal Springs Reservoir	52,409	17,078	58,377	19,022	5,967	1,944	90%
San Andreas Reservoir	17,014	5,544	18,996	6,190	1,982	646	90%
Pilarcitos Reservoir	2,504	816	2,995	976	491	160	84%
Total Local Storage	182,919	59,604	227,688	74,192	44,769	14,588	80%
Total System	1,260,108		1,460,488		213,546		86%

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

<sup>2</sup> Maximum Cherry Reservoir storage with flash-boards in.

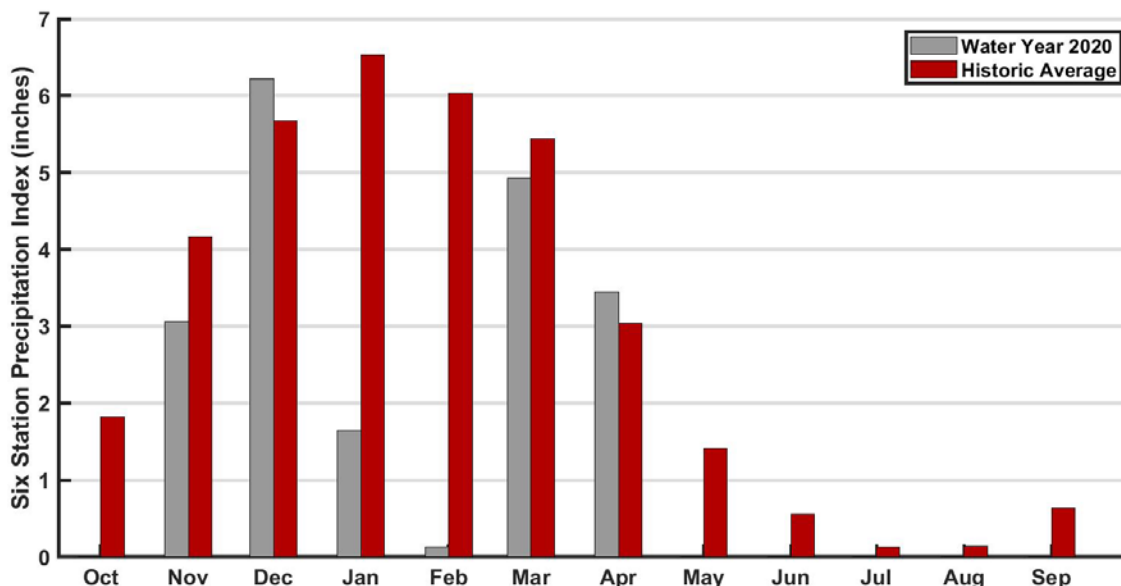
<sup>3</sup> Maximum Lake Eleanor storage with flash-boards in.



**Figure 1:** Monthly system storage for past 12 months in thousand acre-feet (TAF). Color bands show 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.

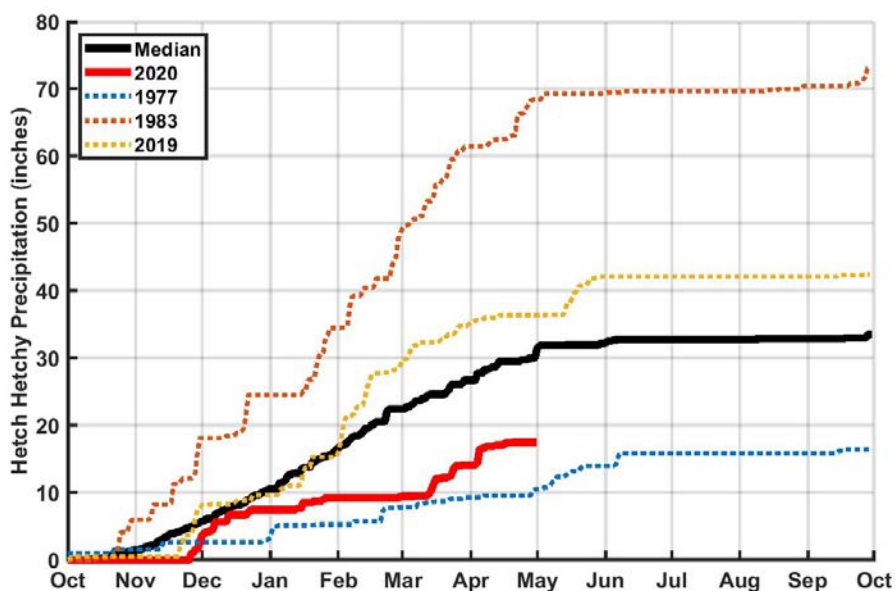
## Hetch Hetchy System Precipitation Index

*Current Month:* The April 2020 six-station precipitation index was 3.45 inches, or 113% of the average index for the month. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.



**Figure 2:** Monthly distribution of the six-station precipitation index as compared to the annual average precipitation for April 2020. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

*Cumulative Precipitation to Date:* As of May 1, the six-station precipitation index for water year (WY) 2020 was 19.47 inches, which is 54% of the average annual water year total. Hetch Hetchy received 3.34 inches precipitation in April for a total of 17.46 inches for WY 2020, or 49% of average to-date. The cumulative Hetch Hetchy precipitation is shown in Figure 3 in red.



**Figure 3:** Water Year 2020 cumulative precipitation measured at Hetch Hetchy Weather Station. Median cumulative precipitation measured at Hetch Hetchy Weather Station and example wet and dry years are included with Water Year 2020 for comparison purposes.

## Tuolumne Basin Unimpaired Inflow

Unimpaired inflow to SFPUC reservoirs and the Tuolumne River at La Grange for April 2020 and the year to date is summarized below in Table 2.

<b>Table 2</b> <b>Calculated Reservoir Inflows and Water Available to City</b>								
* All flows are in acre-feet	April 2020				October 1, 2019 through May 1, 2020			
	Observed Flow	Median <sup>1</sup>	Mean <sup>1</sup>	Percent of Mean	Observed Flow	Median <sup>1</sup>	Mean <sup>1</sup>	Percent of Mean
Inflow to Hetch Hetchy Reservoir	84,137	88,560	90,498	93%	130,308	204,241	220,763	59%
Inflow to Cherry Reservoir and Lake Eleanor	79,793	72,601	73,380	109%	143,178	197,337	211,960	68%
Tuolumne River at La Grange	261,602	263,768	273,526	96%	534,796	775,189	874,029	61%
Water Available to City	75,519	82,697	96,314	78%	92,536	231,180	319,591	29%

<sup>1</sup>Hydrologic Record: 1919-2015

## Hetch Hetchy System Operations

Hetch Hetchy Reservoir power draft and stream releases during the month totaled 48,637 acre-feet. Hetch Hetchy Reservoir minimum instream release requirements for April were 35 cfs. Total precipitation thus far for Water Year 2020 has resulted in a Water Year Type C (dry) for Hetch Hetchy Reservoir. Instream release requirements for May are 50 cfs.

Cherry Reservoir valve and power draft releases totaled 31,890 acre-feet for the month and were used to maintain seasonal target elevations. 10,828 acre-feet of water was transferred from Lake Eleanor to Cherry Reservoir via the Cherry / Eleanor Tunnel. The required minimum instream release from Cherry Reservoir for April was 5 cfs and remains 5 cfs for May. Lake Eleanor required minimum instream release were 10 cfs for April 1<sup>st</sup>, increased to 20 cfs on April 15<sup>th</sup> and remain 20 cfs for May.

## Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant average production rate for April was 43 MGD. The Sunol Valley Water Treatment Plant average production rate for the month was 13 MGD.

## Local System Water Delivery

The average April delivery rate was 188 MGD, which is a 4% decrease below the March delivery rate of 195 MGD.

## Local Precipitation

The rainfall summary for April 2020 is presented in Table 3.

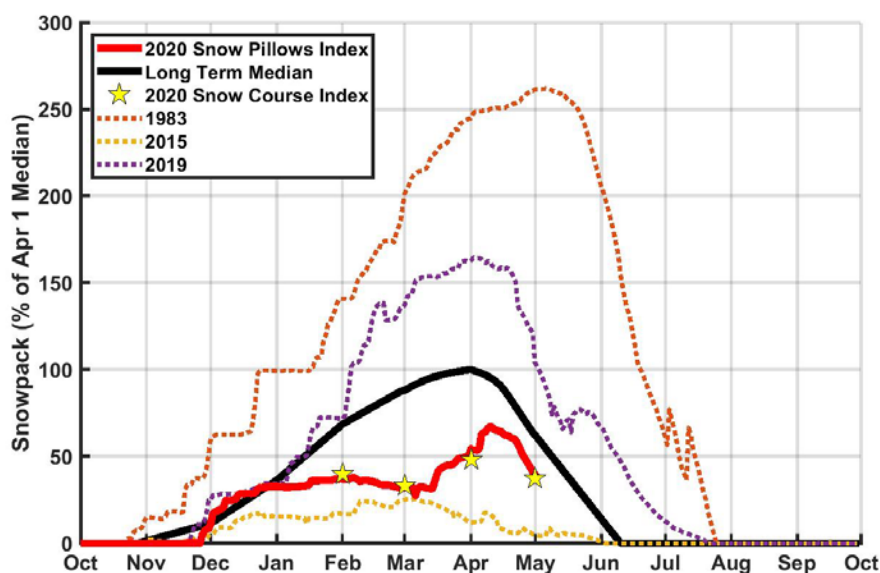
Weather Station Location	April		Water Year 2020	
	Total (inches)	Percent of Mean for the Month	Total (inches)	Percent of Mean for the Year-To-Date
Pilarcitos Reservoir	3.78	148 %	22.09	62 %
Lower Crystal Springs Reservoir	2.13	118 %	14.29	57 %
Calaveras Reservoir	2.54	153 %	12.76	63 %

## Snowpack, Water Supply and Planned Water Supply Management

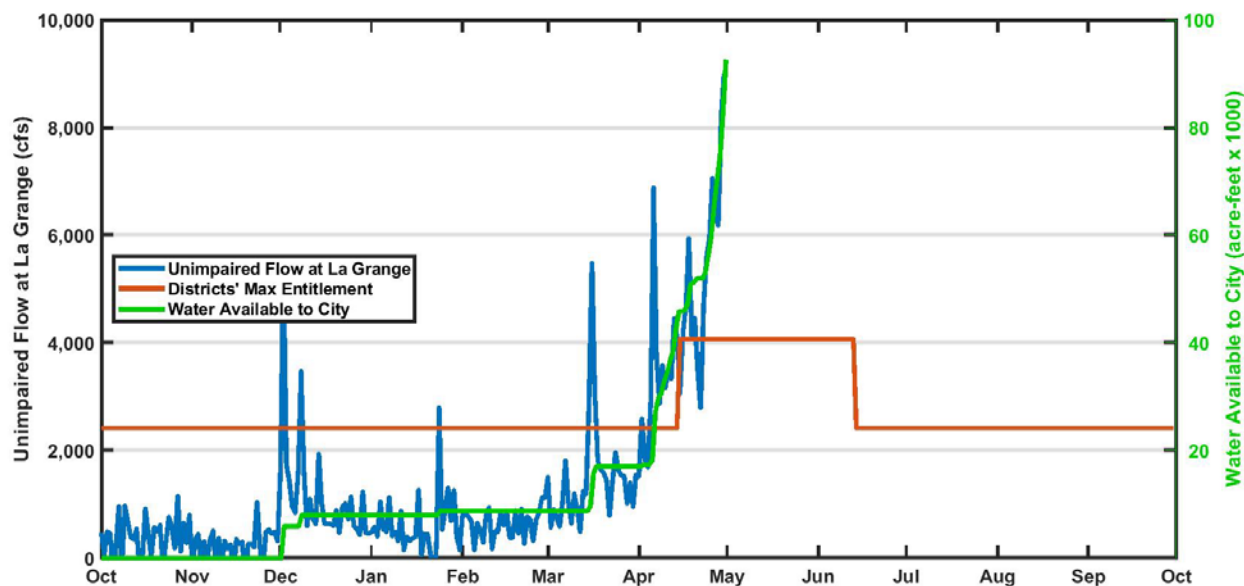
Based on snow water content measured at Tuolumne Basin manual snow surveys and snow pillows, the May 1 snowpack was 35% of the median snowpack for this time of year (Figure 4). The seasonal snowmelt began in mid-April and is continuing during warm weather in the first weeks of May.

Updated water supply forecasts (WSFM; Figure 6) based on the May 1 snow surveys show that Hetch Hetchy Reservoir, Cherry Reservoir and Lake Eleanor will all fill this runoff season, with some additional water available for power generation. In all but the wettest scenario, there is insufficient water to refill Water Bank after runoff.

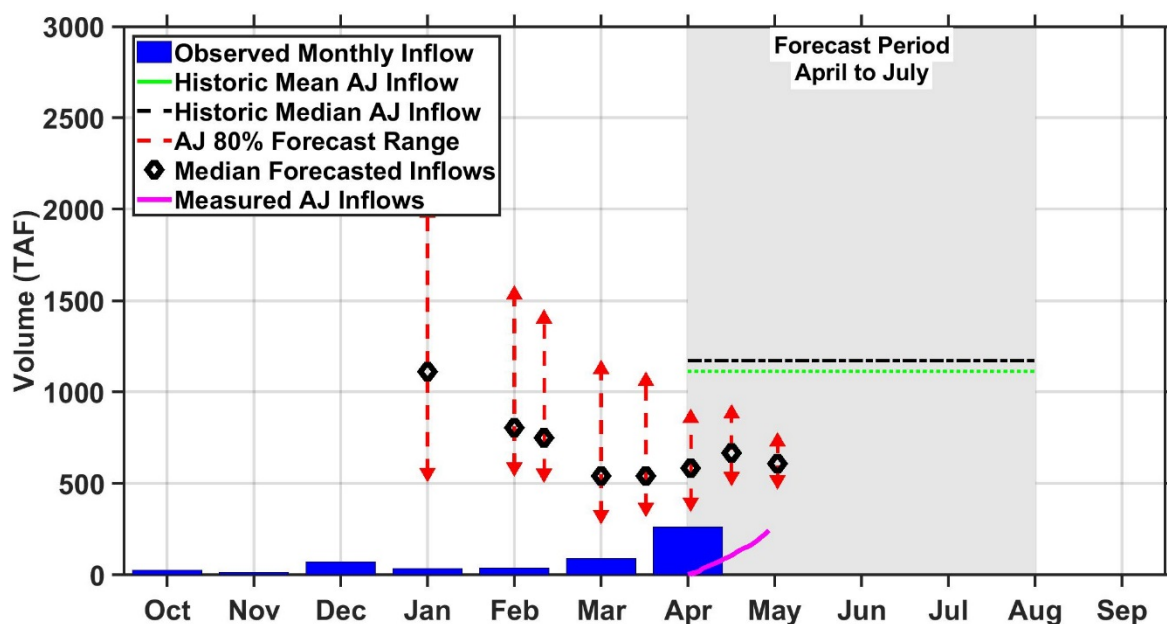
Total system storage is 87% full as reservoirs have been managed through the winter to maximize storage and spring runoff. SJPL1 is out of service for repairs through March 2021. Deliveries are currently at the maximum capacity of 247 MGD and are expected to remain there throughout the month. Throughout May, Hetch Hetchy Reservoir storage is expected to rise as inflows exceed power generation, deliveries and stream releases. Cherry / Eleanor Pumps are transferring water from Lake Eleanor to Cherry Reservoir for power generation. This transferred water will be used for generation at Holm Powerhouse and stored in Water Bank. Cherry Reservoir will continue to refill as inflows increase. The Water Bank is expected to continue debiting as water is stored in upcountry reservoirs.



**Figure 4:** Tuolumne River Basin 10 Station Snow Index (lines), based on real time snow pillow SWE measurements. Also plotted are the mean monthly manual snow surveys (stars) in the Tuolumne Basin.



**Figure 5:** Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City, as of May 6. As of May 6 there has been 116,940 acre-feet available to the City in Water Year 2020.



**Figure 6:** April to July WSFM inflow forecasts to the Tuolumne River at LaGrange – the extent of the CCSF water rights. Dry conditions in January and February resulted in reduced forecasts through the winter. Above average precipitation in April resulted in a narrowing and increase in volume of the forecast range in the last 3 forecasts. The May 1 forecast is still well below average.