San Francisco Public Utilities Commission
Hydrological Conditions Report
January 2020

J. Chester, C. Graham, N. Waelty, February 5, 2020

Lake Eleanor Reservoir. Elevation 4655 ft with a capacity of 21,500 acre-feet. As seen from the air January 25, 2020

System Storage

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

Table 1
Current System Storage
as of February 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[1]	252,274		340,830		88,556		74%
Cherry Reservoir[2]	219,877		268,810		48,933		82%
Lake Eleanor[3]	22,704		21,495		0		100%
Water Bank	558,294		570,000		11,706		98%
Tuolumne Storage	1,053,149		1,201,135		147,986		88%
Local Bay Area Storage							
Calaveras Reservoir	61,495	20,038	96,824	31,550	35,329	11,512	64%
San Antonio Reservoir	38,671	12,601	50,496	16,454	11,825	3,853	77%
Crystal Springs Reservoir	50,846	16,568	58,377	19,022	7,530	2,454	87%
San Andreas Reservoir	15,221	4,960	18,996	6,190	3,775	1,230	80%
Pilarcitos Reservoir	2,573	838	2,995	976	422	137	86%
Total Local Storage	168,806	55,005	227,688	74,192	58,882	19,187	74%
Total System	1,221,955		1,428,823		208,076		86%

[1] Maximum Hetch Hetchy Reservoir storage with drum gates deactivated.
[2] Maximum Cherry Reservoir storage with flash-boards out.
[3] Maximum Lake Eleanor storage with flash-boards out.

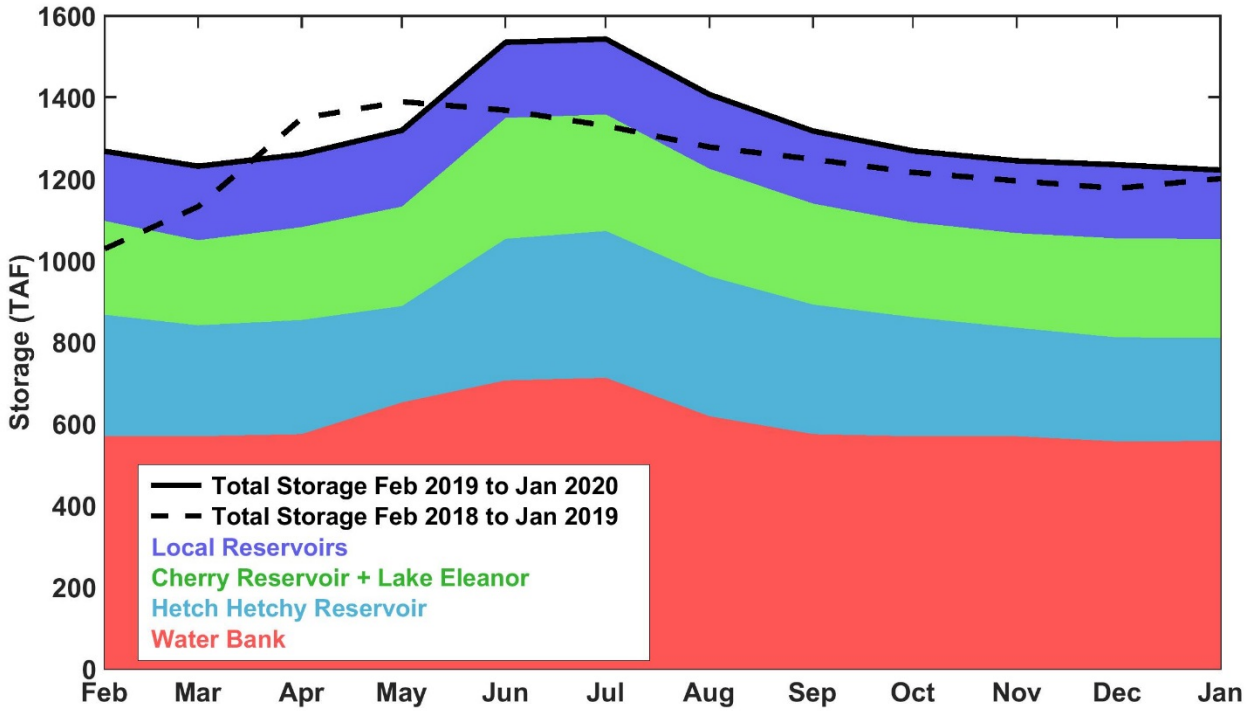

Figure 1: Monthly system storage for past 12 months in thousand acre-feet (TAF). Color bands show contributions to total system storage. Solid black line shows total system storage for the past 12 months. Dashed black line shows total system storage the previous 12 months.

Hetch Hetchy System Precipitation Index

Current Month: The January six-station precipitation index was 1.64 inches, or 25% 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.

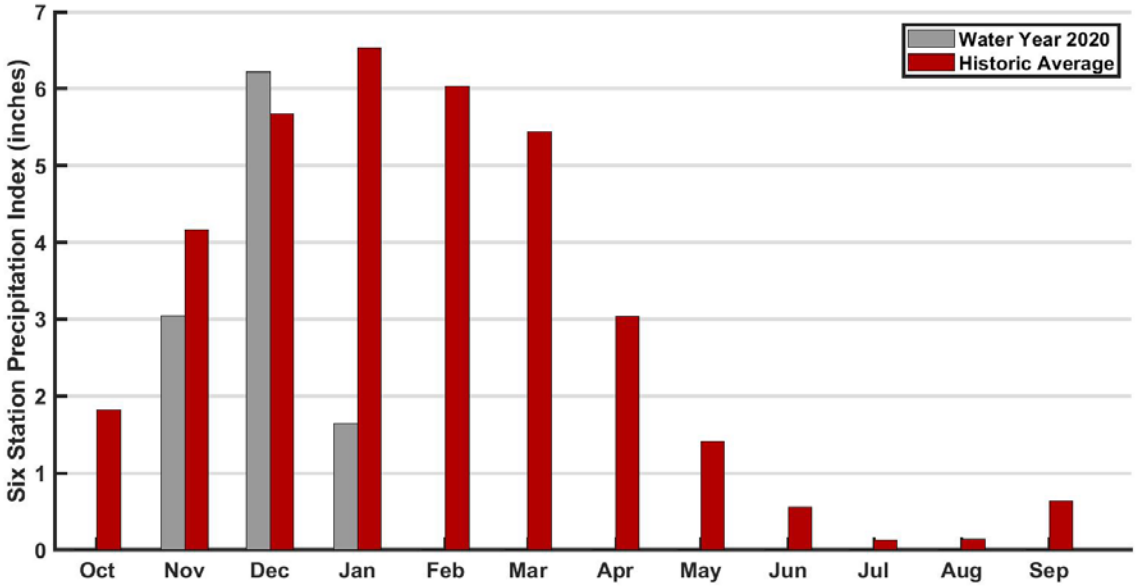

Figure 2: Monthly distribution of the six-station precipitation index as compared to the annual average precipitation for January 2020. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

Cumulative Precipitation to Date: As of February 1st, the six-station precipitation index for Water Year 2020 was 10.96 inches, which is 30% of the average annual water year total. Hetch Hetchy Weather Station received 1.71 inches of precipitation in January, for a total of 9.19 inches for Water Year 2020. The cumulative Hetch Hetchy Weather Station precipitation is shown in Figure 3 in red.

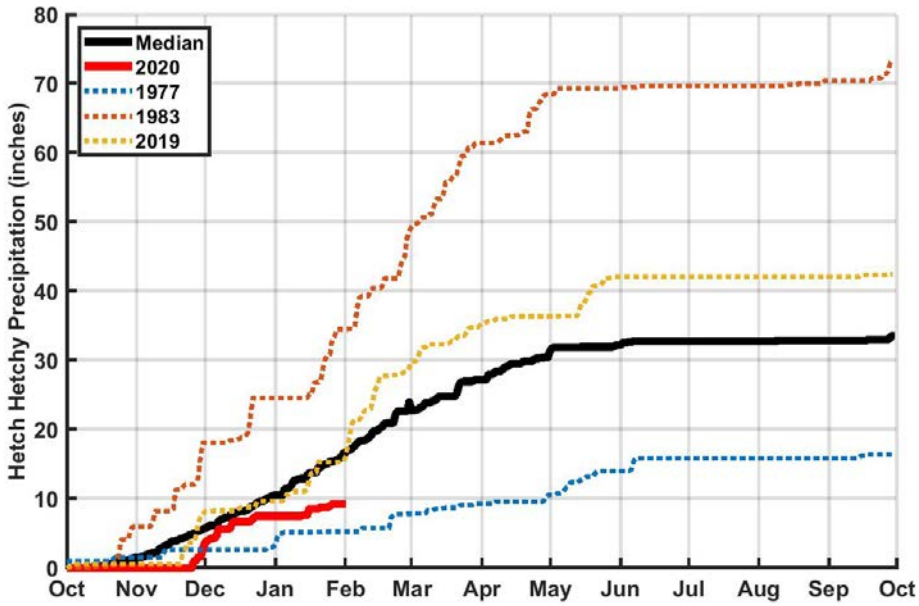

Figure 3: Water Year 2020 cumulative precipitation measured at Hetch Hetchy Weather Station. Median cumulative precipitation measured at Hetch Hetchy Weather Station and example wet and dry years are included with Water Year 2020 for comparison purposes.

Tuolumne Basin Unimpaired Inflow

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

Table 2
Calculated Reservoir Inflows and Water Available to City

* All flows are in acre-feet	January, 2020				October 1, 2019 through February 1, 2020			
	Observed Flow	Median[1]	Mean[1]	Percent of Mean	Observed Flow	Median[1]	Mean[1]	Percent of Mean
Inflow to Hetch Hetchy Reservoir	6,756	15,297	23,063	29%	18,381	49,332	63,898	29%
Inflow to Cherry Reservoir and Lake Eleanor	9,884	16,497	24,545	40%	23,313	52,114	69,887	33%
Tuolumne River at La Grange	36,204	73,463	119,307	30%	145,842	180,751	269,756	54%
Water Available to City	750	7,251	49,765	2%	8,750	22,226	102,270	9%

[1]Hydrologic Record: 1919-2015

Hetch Hetchy System Operations

Hetch Hetchy Reservoir power draft and stream releases during the month totaled 9,176 acre-feet. Hetch Hetchy Reservoir minimum instream release requirements for January were 35 cfs. Total precipitation thus far for Water Year 2020 has resulted in a Water Year Type C (dry to normal) for Hetch Hetchy Reservoir. Instream release requirements for February are 35 cfs.

Cherry Reservoir valve and power draft releases totaled 7,999 acre-feet for the month and were used to maintain seasonal target elevations. 1,910 acre-feet of water was transferred from Lake Eleanor to Cherry Reservoir via the Cherry / Eleanor Diversion. The required minimum instream release from Cherry Reservoir and Lake Eleanor were 5 cfs for January and remain 5 cfs for February.

Regional System Treatment Plant Production

Treatment plant average production rates were higher for the month due to the Hetch Hetchy water system shutdown due to planned maintenance work. The Harry Tracy Water Treatment Plant average production rate for January was 64 MGD. The Sunol Valley Water Treatment Plant average production rate for the month was 80 MGD.

Local System Water Delivery

The average January delivery rate was 157 MGD, no change from the December delivery rate of 157 MGD.

Local Precipitation

Drier than average precipitation totals were recorded for the month. The rainfall summary for January 2020 and Water Year-to-date is presented in Table 3.

Table 3
Precipitation Totals at Three Local Area Reservoirs

Weather Station Location	January		Water Year 2020	
	Total (inches)	Percent of Mean for the Month	Total (inches)	Percent of Mean for the Year-To-Date
Pilarcitos Reservoir	4.53	66 %	14.74	71 %
Lower Crystal Springs Reservoir	3.16	66 %	9.27	64 %
Calaveras Reservoir	1.78	46 %	6.68	59 %

Snowpack, Water Supply and Planned Water Supply Management

Based on snow water content measured at Tuolumne Basin snow pillows, the February 1 snowpack was 43% of the median April 1 peak snowpack (Figure 4). Dry forecasts for the coming two weeks will result in well below average snowpack for mid-February. Longer term forecasts call for dry conditions to persist into late February.

Total system storage is 86% full as reservoirs have been managed through the fall and early winter to maximize storage. As of February 1, 8,750 acre-feet of water has been available to the City (Figure 5). The Hetch Hetchy water system entered a planned, 30 day shutdown on January 6. Water deliveries resumed on February 5 at a rate of 150 MGD. Throughout February, Hetch Hetchy Reservoir storage is expected to gradually decrease, as required stream releases and deliveries are expected to exceed inflows. After Lake Eleanor spill exceeded 50 cfs on January 26, HHWP activated the Cherry / Eleanor Pumps, and is transferring water 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 be maintained at the current storage throughout February as scheduled generation will balance inflows. Water Bank balance is expected to remain nearly full as upcountry releases match inflows.

The precipitation to date is around 50% of normal, equivalent to the 90th percentile of the precipitation distribution (driest 10% of historic conditions). Due to the high carryover storage and conservative water management, the latest seasonal inflow forecasts show a 95% likelihood of refilling Hetch Hetchy Reservoir and a 100% likelihood of refilling Cherry Reservoir and Lake Eleanor. However, the forecasts show only a 45% chance of refilling Water Bank. Instream releases and power generation will be tightly controlled to minimize spill from Water Bank, maximizing end of runoff storage in the system. This may result in curtailment of power generation in February and March.

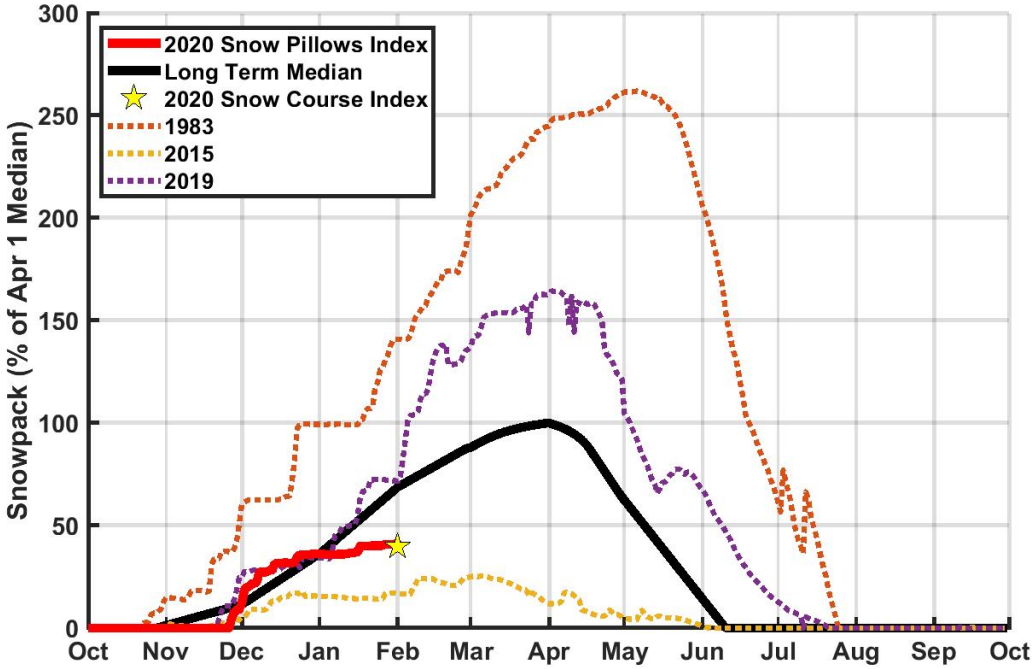

Figure 4: Tuolumne River Basin 10 Station Snow Index (lines), based on real time snow pillow SWE measurements in the Tuolumne Basin.

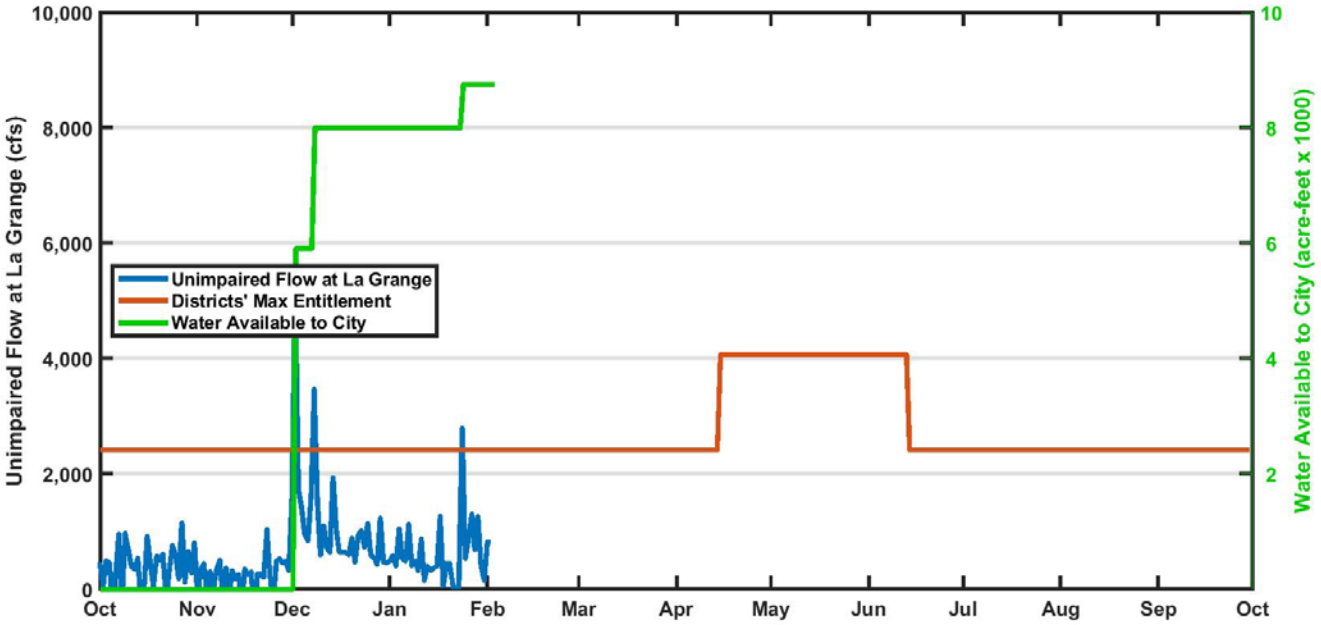

Figure 5: Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City. To date there has been 8,750 acre-feet available to the City in Water Year 2020.