

San Francisco Public Utilities Commission

Hydrological Conditions Report

March 2022

J. Chester, C. Graham, N. Waelty, April 11, 2022



Spring has sprung! While not officially spring yet, the rivers and creeks that fill our reservoirs are already beginning to show snowmelt runoff. Accordingly the San Francisco Public Utilities (SFPUC) managing spring runoff to safely fill upcountry reservoirs including Hetch Hetchy Reservoir, Lake Eleanor, and Cherry Reservoir. The photo above was taken on Rancheria Creek about a mile upstream of Hetch Hetchy Reservoir.

System Storage

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

Table 1 Current System Storage as of April 1, 2022							
	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	294,968		340,830		45,862		87%
Cherry Reservoir ²	234,591		268,800		34,209		87%
Lake Eleanor ³	23,914		21,495		0		100%
Water Bank	343,742		570,000		226,258		60%
Tuolumne Storage	897,215		1,201,125		303,910		75%
Local Bay Area Storage							
Calaveras Reservoir	64,471	21,008	96,824	31,550	32,352	10,542	67%
San Antonio Reservoir	37,902	12,350	52,506	17,109	14,604	4,759	72%
Crystal Springs Reservoir	44,760	14,585	58,377	19,022	13,616	4,437	77%
San Andreas Reservoir	15,812	5,152	18,996	6,190	3,185	1,038	83%
Pilarcitos Reservoir	2,772	903	2,995	976	223	73	93%
Total Local Storage	165,718	53,999	229,697	74,847	63,979	20,848	72%
Total System	1,062,933		1,430,822		367,889		74%

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.

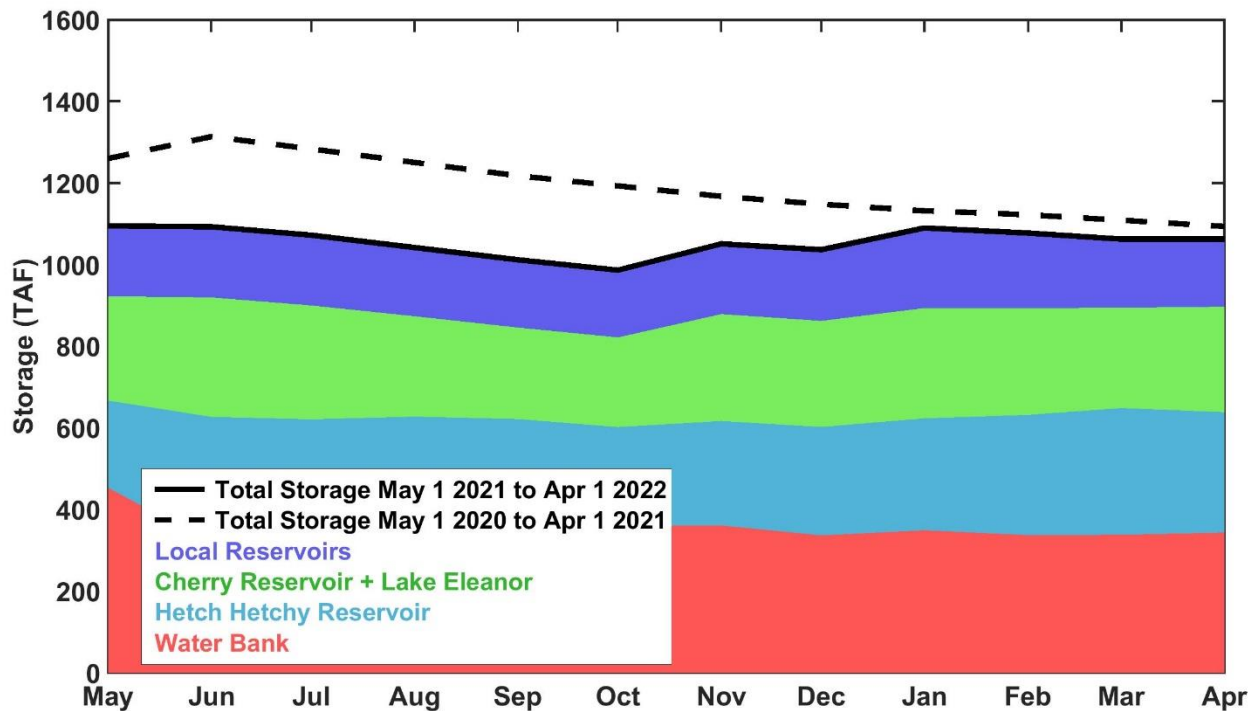


Figure 1: System storage for past 12 months in thousand acre-feet (TAF). Color bands show contributions to total system storage. Solid black line shows total system storage for the past 12 months. Dashed black line shows total system storage the previous 12 months.

Hetch Hetchy System Precipitation Index

Current Month: The March 2022 six-station precipitation index was 1.36 inches, or 30% of the average long-term index for the month. The 2022 January to March precipitation was ~1.5 inches, about 1/3 of the historic low for that period. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

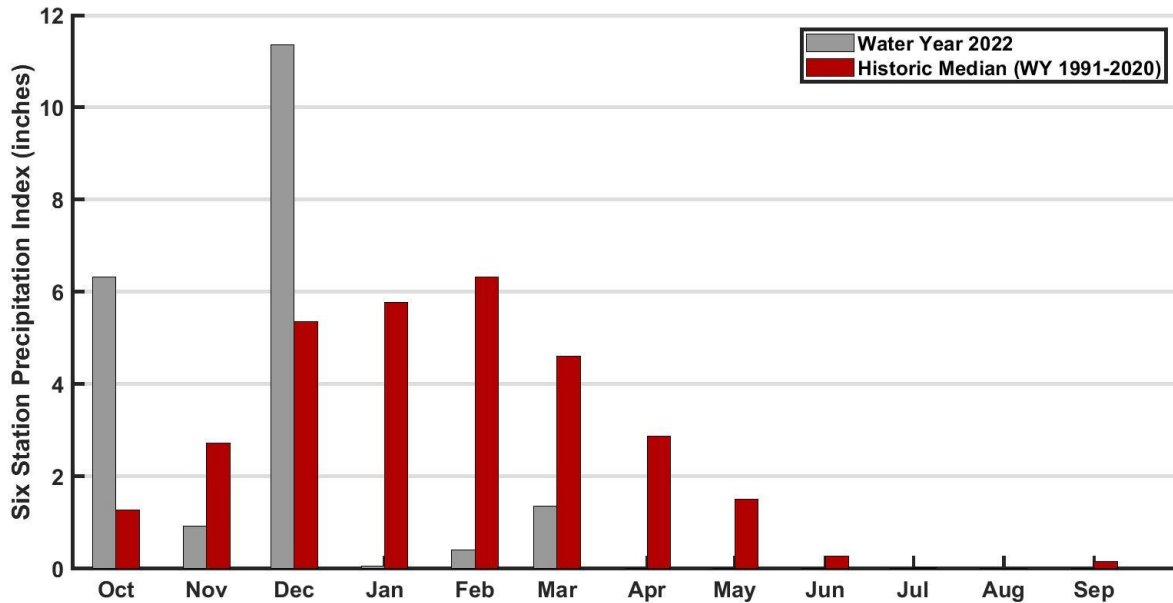


Figure 2: Monthly distribution of the six-station precipitation index relative to the monthly precipitation averages. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

Cumulative Precipitation to Date: As of April 1, the six-station precipitation index for Water Year (WY) 2022 was 20.42 inches, which is 66% of the median annual total and 76% of average to-date. The Hetch Hetchy Weather Station received 1.63 inches of precipitation in March resulting in a total of 19.74 inches for WY 2022, or 68% of median to-date. The cumulative WY 2022 Hetch Hetchy precipitation is shown in Figure 3 in red.

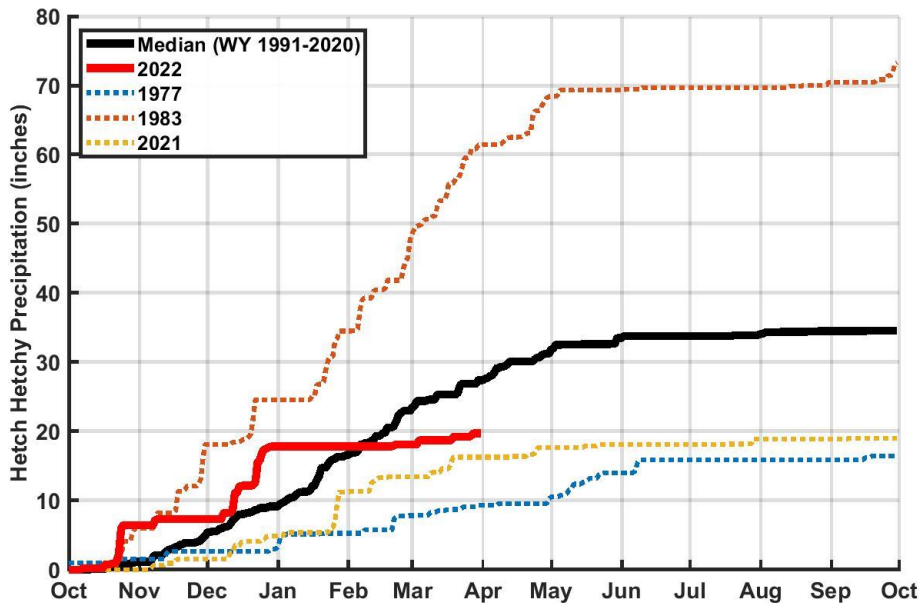


Figure 3: Water Year 2022 cumulative precipitation measured at Hetch Hetchy Weather Station. Median cumulative precipitation measured at Hetch Hetchy Weather Station and example wet and dry years are included with Water Year 2021 for comparison purposes.

Tuolumne Basin Unimpaired Inflow

Unimpaired inflow to SFPUC reservoirs and the Tuolumne River at La Grange for March 2022 and the water 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	March 2022				October 1, 2021 Through April 1, 2022			
	Observed Flow	Median ¹	Mean ¹	Percent of Mean	Observed Flow	Median ¹	Mean ¹	Percent of Mean
Inflow to Hetch Hetchy Reservoir	42,236	43,608	51,029	83%	184,707	122,770	145,672	127%
Inflow to Cherry Reservoir and Lake Eleanor	39,225	52,608	54,863	71%	195,820	157,675	172,787	113%
Tuolumne River at La Grange	113,215	209,444	231,643	49%	567,374	538,755	684,849	83%
Water Available to City	18,807	29,849	98,048	19%	145,344	152,587	285,970	51%

¹Hydrologic Record: 1991-2020

Hetch Hetchy System Operations

Water deliveries via the San Joaquin Pipeline resumed on March 8th at a rate of 150 MGD. Rate changes up to 245 MGD were performed March 10th through 17th.

Hetch Hetchy Reservoir power draft and stream releases during the month 57,652 acre-feet. Hetch Hetchy Reservoir minimum instream release requirements for March were 50 cfs. Total precipitation for Water Year 2022, as of April 1, has resulted in a Water Year Type B for Hetch Hetchy Reservoir. Hetch Hetchy Reservoir instream releases increase from 50 cfs in March to 65 cfs for April.

Cherry Reservoir valve and power draft releases totaled 25,650 acre-feet for the month and were used to maintain seasonal target elevations. The required minimum instream release from Cherry Reservoir for March was 5 cfs and will remain at 5 cfs for April. Lake Eleanor required release for March was 10 cfs and will increase to 15 cfs on April 15.

Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant average production rate for March was 38 MGD. The Sunol Valley Water Treatment Plant average production for the month was 30 MGD.

Regional System Water Delivery

The average March delivery rate was 182 MGD, which is a 6% increase over the February delivery rate of 171 MGD.

Local Precipitation

The rainfall summary for March 2022 is presented in Table 3.

Weather Station Location	March		October 1, 2021 through March 31, 2022	
	Total (inches)	Percent of Mean for the Month	Total (inches)	Percent of Mean for the Year-To-Date
Pilarcitos Reservoir	1.22	25%	37.65	127%
Lower Crystal Springs Reservoir	1.03	32%	20.69	104%
Calaveras Reservoir	0.73	21%	13.49	84%

*Mean Period = WY 1991-2020

Snowpack, Water Supply and Planned Water Supply Management

Despite an above-average start to the Water Year, very little precipitation has come to the region since late December. January-March of 2022 ranks as the driest on record at all measurement stations. Measured precipitation at Hetch Hetchy in Water Year 2022 is currently 70% of the 30-year median to-date (Figure 1). Snowpack as of April 1st is estimated to be at approximately 40% of normal, declining from a peak near the end of December (Figure 5). A dramatic warming trend is anticipated during the April 5-9 period, driving additional snowmelt at most elevations.

Inflow forecasts have decreased in April, driven by the exceptionally dry January through March (Figure 7). Due to high carry over storage and measured snowpack remaining upcountry, current inflow forecasts are sufficient to fill Hetch Hetchy Reservoir, Cherry Reservoir and Lake Eleanor assuming curtailments remain suspended on the Tuolumne River through the end of runoff.

Hetch Hetchy Reservoir is drafting via power generation and instream releases. Kirkwood and Moccasin Powerhouses and SJPL deliveries will be used to manage Hetch Hetchy Reservoir storage during spring runoff. Cherry Reservoir storage is being managed via scheduled generation at Holm Powerhouse. Lake Eleanor is drafting with instream release. The Cherry-Eleanor Pumps are activated and transferring 200 cfs from Lake Eleanor into Cherry Reservoir. Water Bank has begun debiting as reservoir inflows exceed power generation and releases.

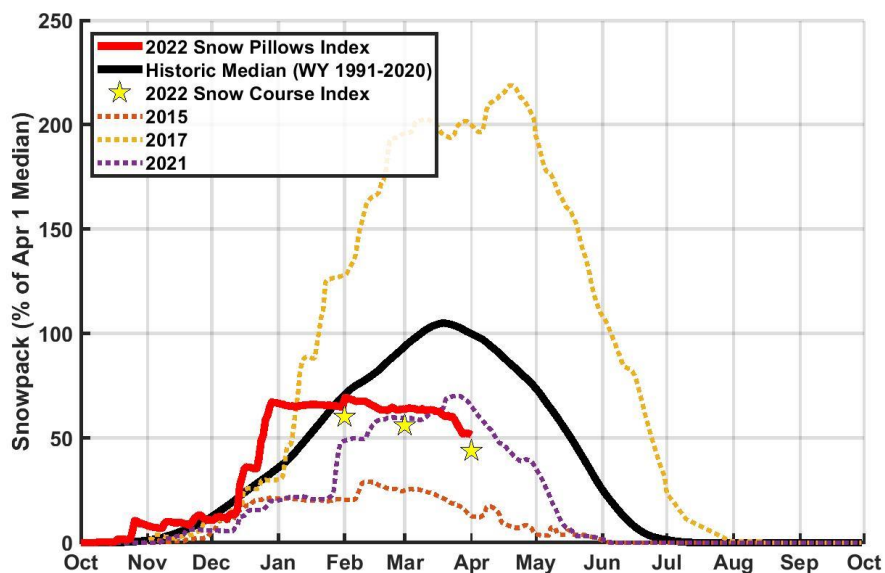


Figure 5: Tuolumne River Basin 10 Station Snow Index (lines), based on real time snow pillow SWE measurements in the Tuolumne Basin.

As of April 1st, there has been 145,344 acre-feet of water available to the city (Figure 6).

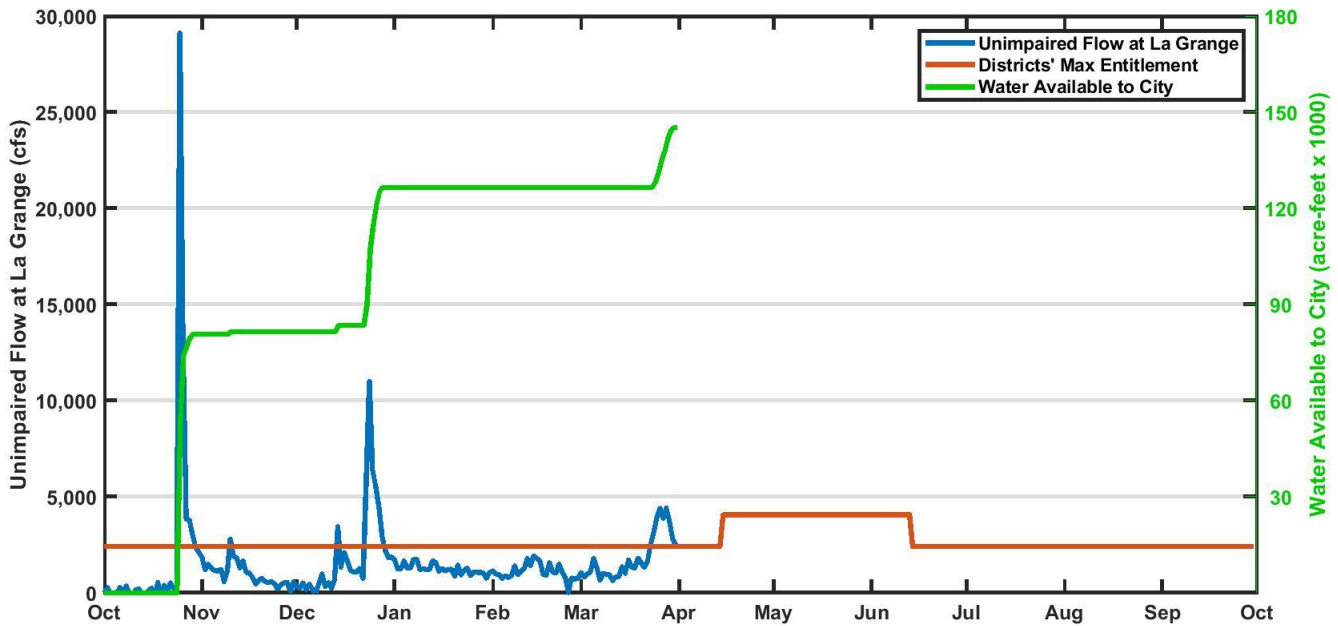


Figure 6: Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City.

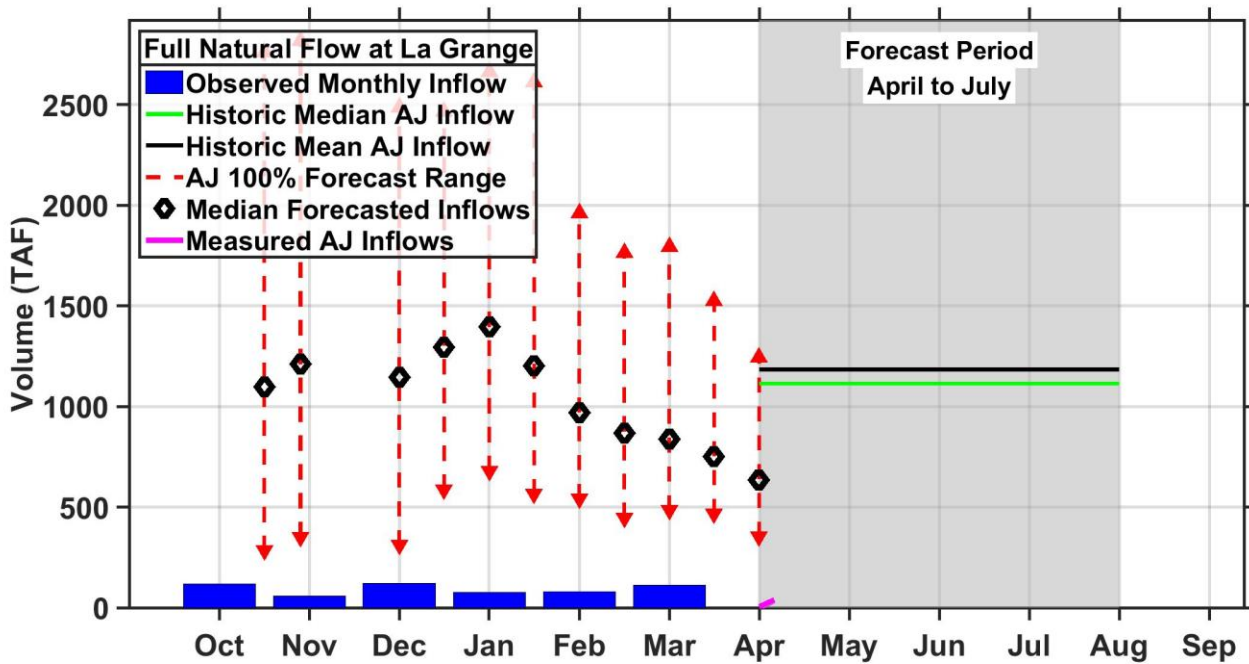


Figure 7: Water Supply Forecast Model of runoff (April to July) on the Tuolumne River at La Grange. This model is driven by precipitation from October to February, and by snow survey data from February through June. The forecast range decreases as time passes due to reduced potential future precipitation. A dry January through March have resulted in a decrease in forecasted inflows in all future precipitation scenarios.