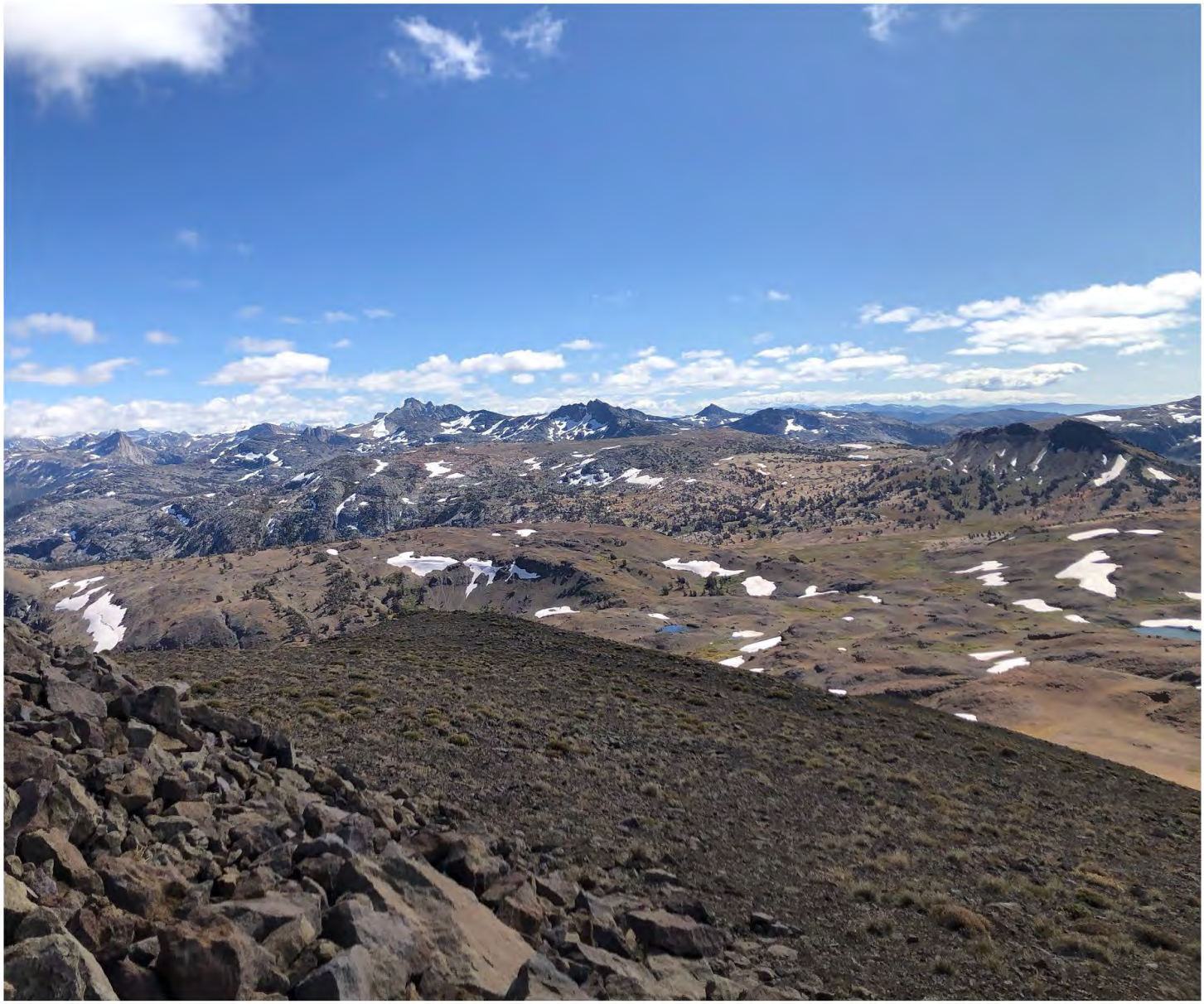
San Francisco Public Utilities Commission
Hydrological Conditions Report
September 2023

J. Chester, C. Graham, N. Waelty, H Forrester Prepared October 6, 2023



Remnant snow fields dapple the highest elevations of the Upper Tuolumne River Watershed on October 3, 2023. Near-record snowpack in Water Year 2023 generated above-average antecedent hydrologic conditions for Water Year 2024.

System Storage

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

Table 1. Current System Storage as of October 1, 2023

	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]	340,637		360,360		19,723		95%
Cherry Reservoir[2]	247,800		273,345		25,545		91%
Lake Eleanor[3]	22,611		27,100		4,489		83%
Water Bank	570,000		570,000		0		100%
Tuolumne Storage	1,181,048		1,230,805		49,757		96%
Local Bay Area Storage							
Calaveras Reservoir	89,495	29,162	96,670	31,500	7,175	2,338	93%
San Antonio Reservoir	50,828	16,562	52,506	17,109	1,678	547	97%
Crystal Springs Reservoir	50,256	16,376	68,743	22,400	18,487	6,024	73%
San Andreas Reservoir	13,679	4,457	18,898	6,158	5,219	1,701	72%
Pilarcitos Reservoir	2,695	878	3,118	1,016	423	138	86%
Total Local Storage	206,954	67,436	239,935	78,183	32,982	10,747	86%
Total System	1,388,002		1,470,740		82,739		94%

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

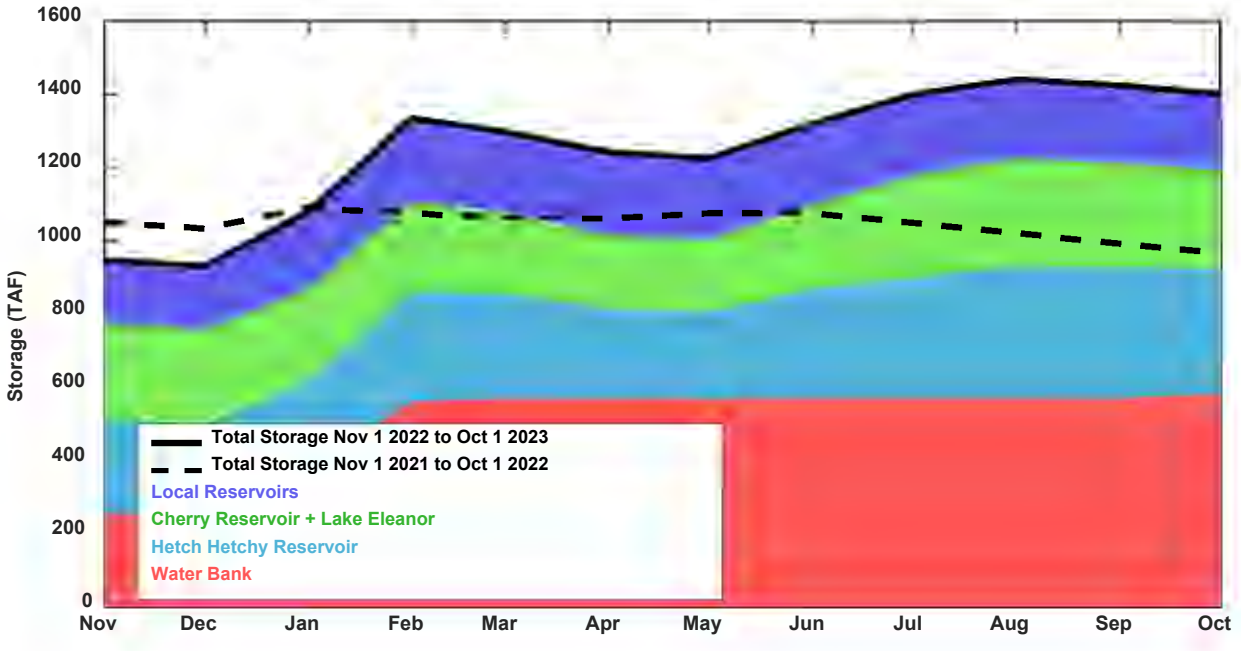


Figure 1: Local and Upcountry Reservoir storage. Color bands show contributions to total system storage. Solid black line shows total system storage for the past 12 months. Dashed black line shows total system storage the previous 12 months.

Hetch Hetchy System Precipitation Index

Current Month: The September 2023 six-station precipitation index was 0.57 inches. The historical median for September is 0.16 inches.

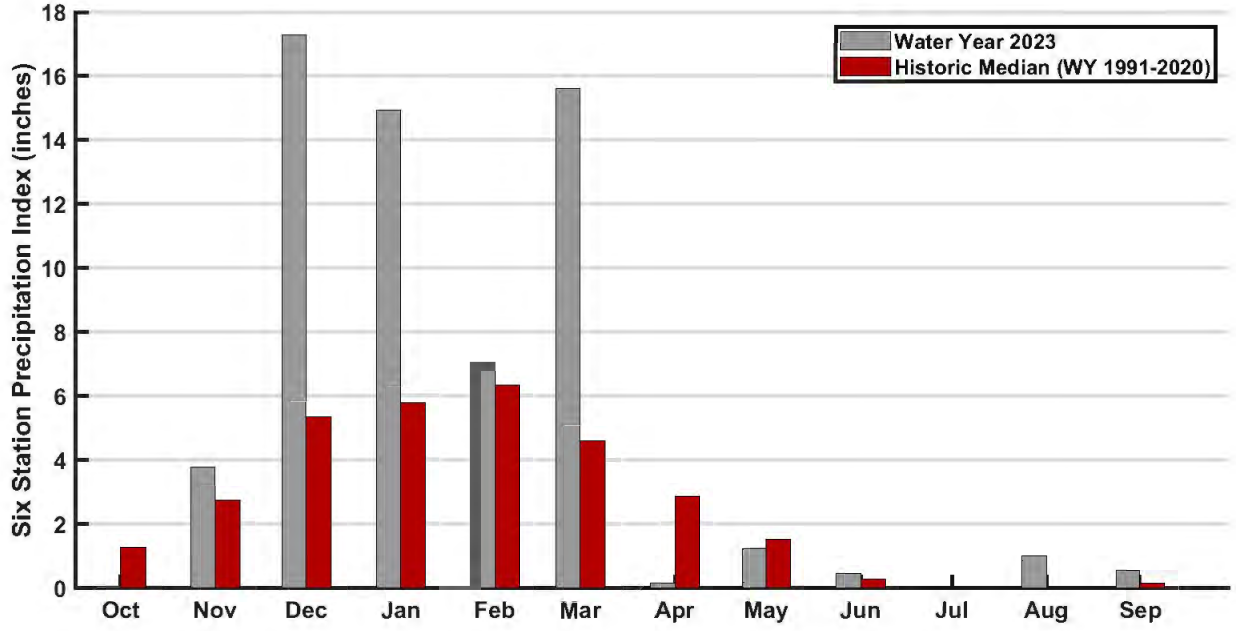


Figure 2: Monthly distribution of the six-station precipitation index relative to the monthly precipitation medians. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

Cumulative Precipitation to Date: The six-station precipitation index for Water Year (WY) 2023 was 62.09 inches, which is 201% of the median. The Hetch Hetchy Weather Station received 0.85 inches of precipitation in September resulting in a total of 65.42inches for WY 2023, or 190% of median for the Water Year. The cumulative WY 2023 Hetch Hetchy Weather Station precipitation is shown in Figure 3 in red.

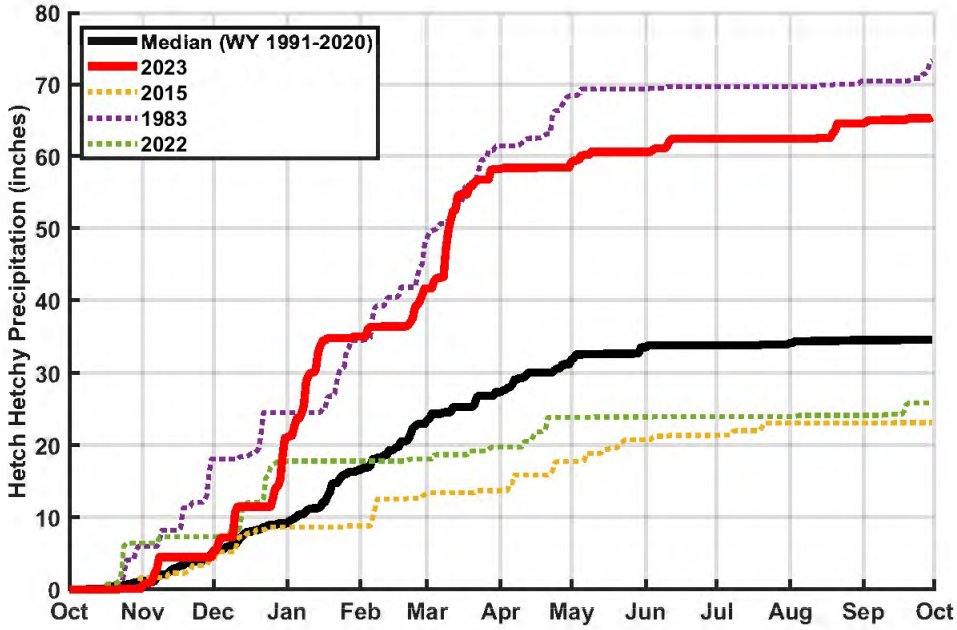


Figure 3: Water Year 2023 cumulative precipitation measured at Hetch Hetchy Weather Station. Median cumulative precipitation measured at Hetch Hetchy Weather Station and example wet and dry years are included with Water Year 2023 for comparison purposes.

Tuolumne Basin Unimpaired Inflow

Unimpaired inflow to SFPUC reservoirs and the Tuolumne River at La Grange for September 2023 and Water Year 2023 is summarized below in Table 2.

Table 2. Calculated reservoir inflows and Water Available to City

* All flows are in acre-feet	September 2023				October 1, 2022 through September 30, 2023			
	Observed Flow	Median[1]	Mean[1]	Percent of Mean	Observed Flow	Median[1]	Mean[1]	Percent of Mean
Inflow to Hetch Hetchy Reservoir	9,707	1,669	3,314	293%	1,532,116	703,970	762,304	201%
Inflow to Cherry Reservoir and Lake Eleanor	3,588	1,537	1,969	182%	907,583	465,619	508,322	179%
Tuolumne River at La Grange	36,363	8,681	12,079	301%	4,176,863	1,664,299	1,942,410	215%
Water Available to City	0	0	5	0%	2,774,104	580,260	870,173	319%

[1]Hydrologic Record: 1991-2020

Hetch Hetchy System Operations

Water deliveries via the San Joaquin Pipeline (SJPL) remained at 208 MGD for the duration of September.

Hetch Hetchy Reservoir power draft and stream releases during the month totaled 27,088 acre-feet. Hetch Hetchy Reservoir required minimum instream release for September 1-15 was 100 cfs and for September 16-30 it was 80 cfs. As of October 1, WY 2023 total inflow volume has kept Hetch Hetchy Reservoir instream releases at a Type A (median to wet) year. Required minimum instream release is 60 cfs for October.

Cherry Reservoir power draft and stream releases totaled 15,124 acre-feet for the month of September. The required minimum instream release from Cherry Reservoir for September was 15 cfs. Required minimum instream release is 5 cfs for October.

Lake Eleanor required minimum instream release for September 1-15 was 20 cfs. For September 16-30 it was 10 cfs and will remain at 10 cfs through October.

Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant average production rate for September was 18 MGD. The Sunol Valley Water Treatment Plant production for the month was 19 MGD.

Regional System Water Delivery

The average September delivery rate was 211 MGD which is a 5% decrease under the August delivery rate of 221 MGD.

Local Precipitation

The rainfall summary for September 2023 and Water Year 2023 is presented in Table 3.

Table 3
Precipitation Totals at Three Local Area Reservoirs

Weather Station Location	September 2023		October 1, 2022 through September 30, 2023	
	Total (inches)	Mean for the Month (inches)	Total (inches)	Percent of Mean for the Year-To-Date
Pilarcitos Reservoir	0.54	0.01	60.75	181%
Lower Crystal Springs Reservoir	0.14	0.03	44.64	202%
Calaveras Reservoir	0.11	0.01	39.32	218%

*Mean Period = WY 1991-2020

Water Supply and Planned Water Supply Management

Thirty-one atmospheric rivers from mid-December to the end of March established a near-historic snowpack in the Sierra Nevada. This resulted in a historic water year inflow volume into the upcountry reservoirs. Hetch Hetchy reservoir had the second highest on record at 1,532,116 acre-feet and Cherry-Eleanor combined inflows had the third highest inflow on record at 907,583 acre-feet. This resulted in the third largest cumulative Water Available to the City (WAC) volume on record at 2,774,104 acre-feet (Figure 4). WY 2023 was the second wettest on record in terms of precipitation measured at Hetch Hetchy (Figure 5).

Hetch Hetchy Reservoir is nearly full and drafting via minimum required streamflow releases and power generation for water deliveries. Cherry Reservoir is drafting via minimum required streamflow releases to manage seasonal reservoir storage targets. Holm Powerhouse generation will be minimized this fall to maintain storage for power generation later this year.
Lake Eleanor is drafting via the Cherry-Eleanor pumps and minimum required streamflow releases.

Water Bank will begin debiting in October as inflows into all three upcountry reservoirs will exceed releases and water deliveries.

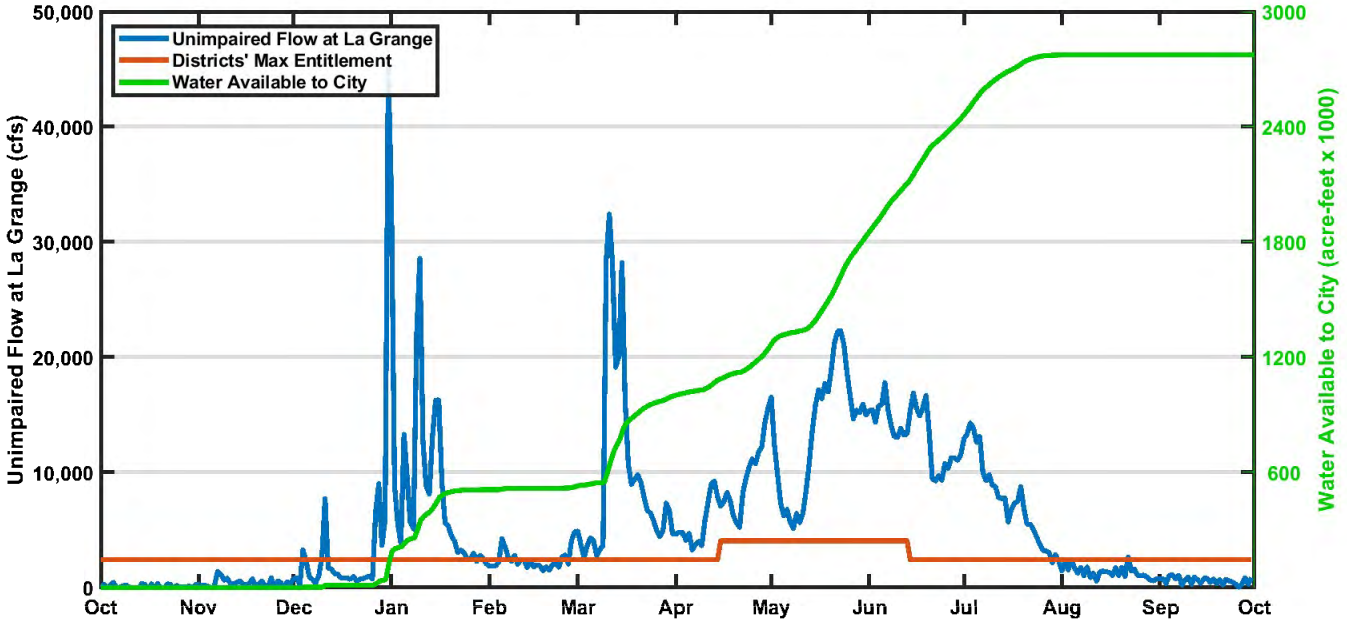


Figure 4: Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City.

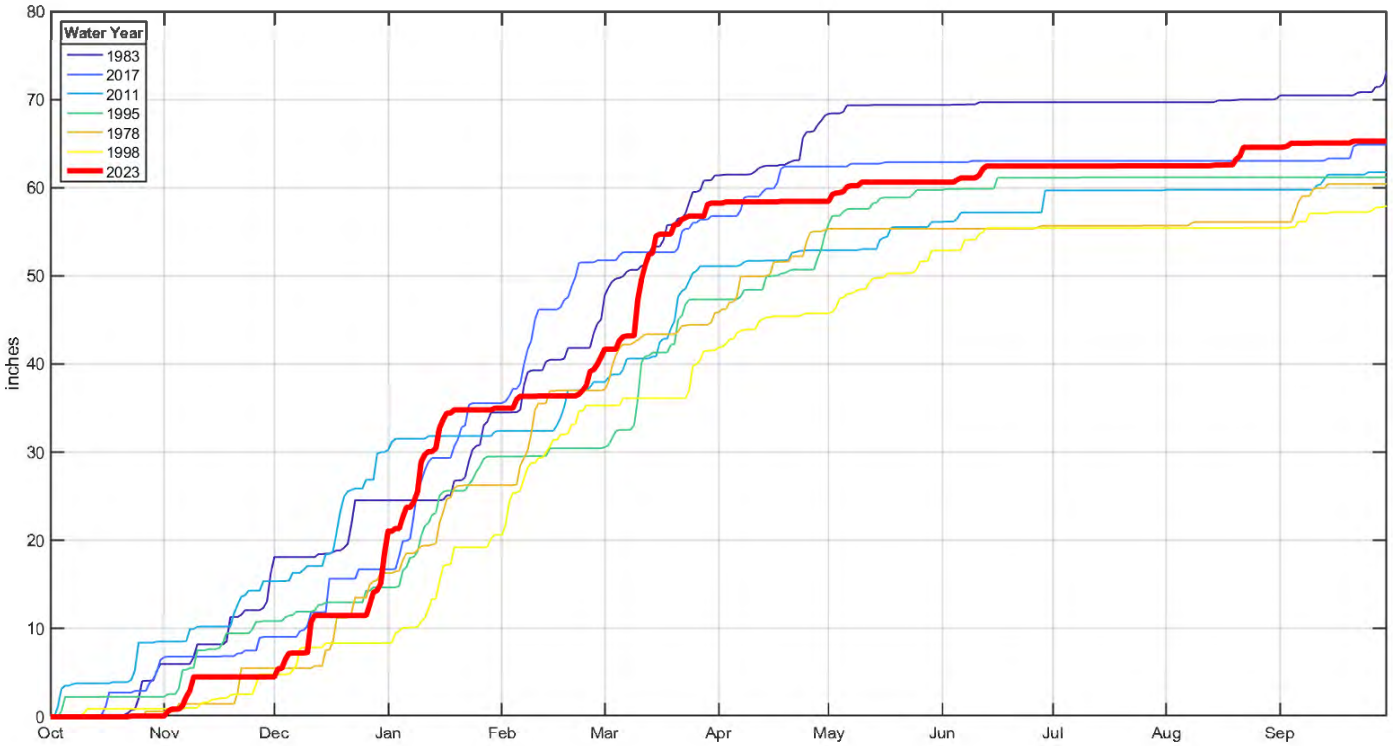


Figure 5: Hetch Hetchy precipitation to date for WY 2023 with the six wettest years on record for comparison. Water Year 2023 was the second wettest year on record.

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The Moccasin Compound is home to the Hetch Hetchy Water and Power Division of the San Francisco Public Utilities Commission. Located along the Hetch Hetchy Aqueduct in the Sierra Nevada Foothills, the Moccasin Compound host offices, a corporate yard, a laboratory, a ball field, a California Department of Fish and Wildlife fish hatchery and employee housing. Upward of 300 employees and contractors report to Moccasin for work.

System Storage

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

Table 1. Current System Storage as of November 1, 2023

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	acre-feet	millions of gallons	acre-feet	millions of gallons	acre-feet	millions of gallons	
Tuolumne System							
Hetch Hetchy Reservoir[1]	320,924		340,830		19,906		94%
Cherry Reservoir[2]	250,030		268,811		18,781		93%
Lake Eleanor[3]	18,247		21,495		3,248		85%
Water Bank	570,000		570,000		0		100%
Tuolumne Storage	1,159,201		1,201,136		41,935		97%
Local Bay Area Storage							
Calaveras Reservoir	86,758	28,270	96,670	31,500	9,912	3,230	90%
San Antonio Reservoir	49183	16,026	52,506	17,109	3,323	1,083	94%
Crystal Springs Reservoir	50,966	16,607	68,743	22,400	17,777	5,793	74%
San Andreas Reservoir	13,579	4,425	18,898	6,158	5,319	1,733	72%
Pilarcitos Reservoir	2,580	841	3,118	1,016	538	175	83%
Total Local Storage	203,066	66,169	239,935	78,183	36,869	12,014	85%
Total System	1,362,267		1,441,072		78,804		95%

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

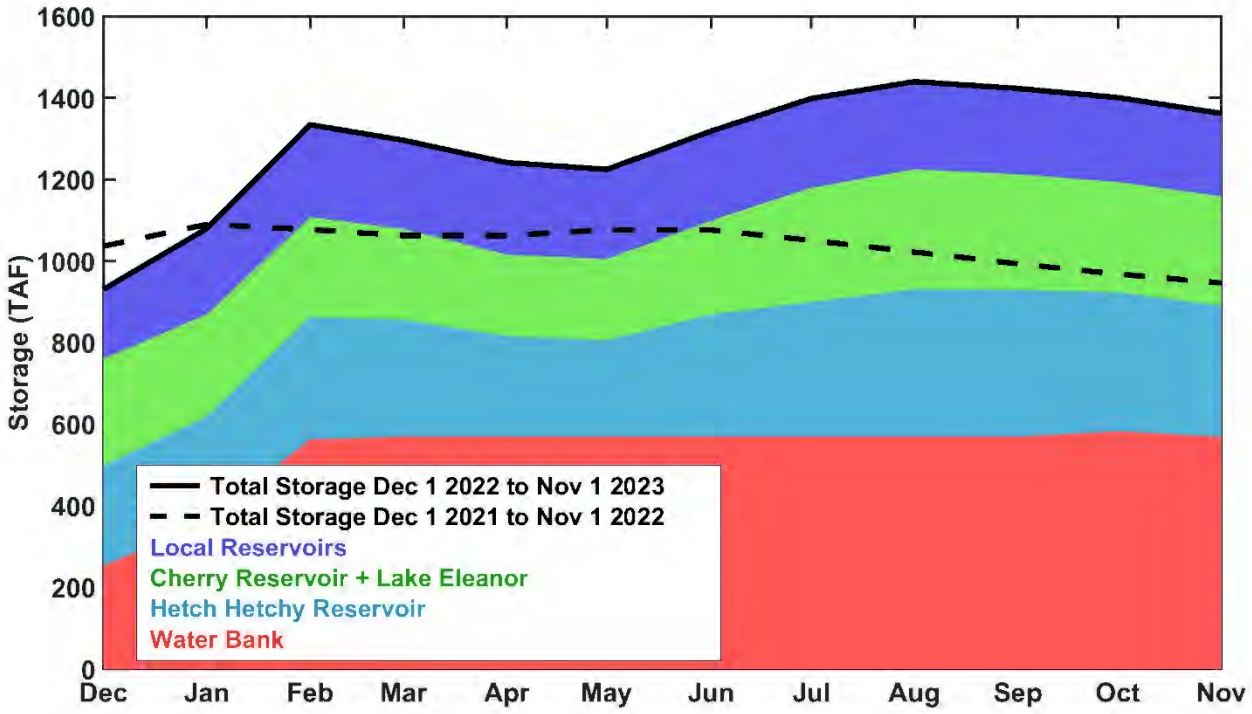


Figure 1: Local and Upcountry Reservoir storage. Color bands show contributions to total system storage. Solid black line shows total system storage for the past 12 months. Dashed black line shows total system storage the previous 12 months.

Hetch Hetchy System Precipitation Index

Current Month: The October 2023 six-station precipitation index was 0.05 inches, which is 4% of the 1991-2020 October median.

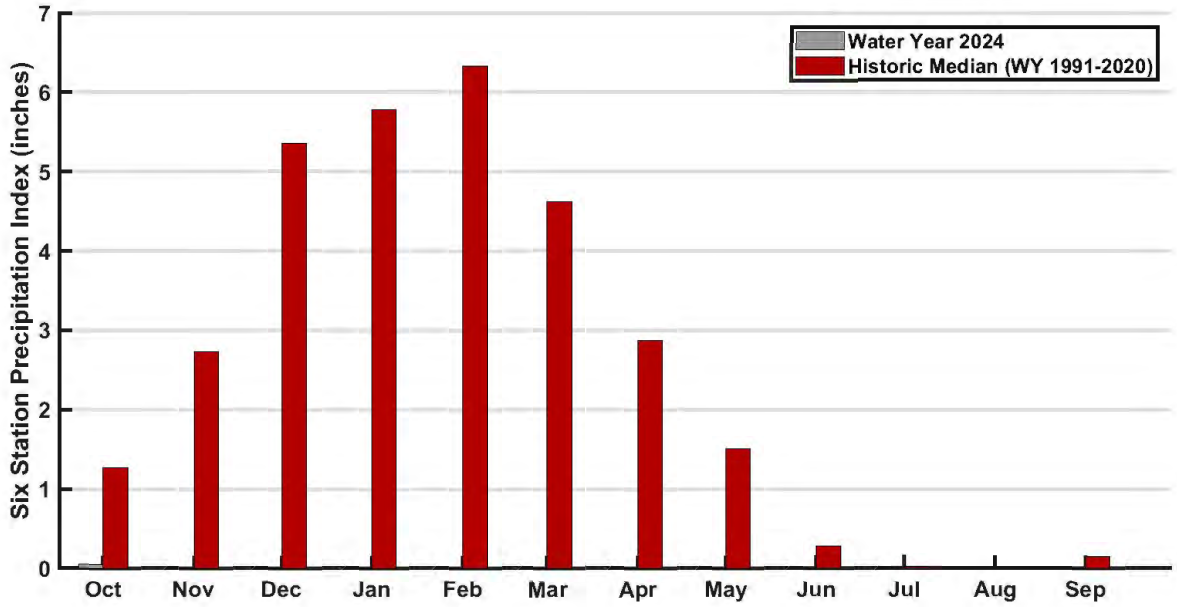


Figure 2: Monthly distribution of the six-station precipitation index relative to the monthly precipitation medians. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

Cumulative Precipitation to Date: The cumulative six-station precipitation index for Water Year (WY) 2024 is 0.05 inches, which is 4% of the median to date. The Hetch Hetchy Weather Station received 0.0.1 inches of precipitation in October resulting in a total of 0.01 inches for WY 2024, or 1% of median for the Water Year to date. The cumulative WY 2024 Hetch Hetchy Weather Station precipitation is shown in Figure 3 in red.

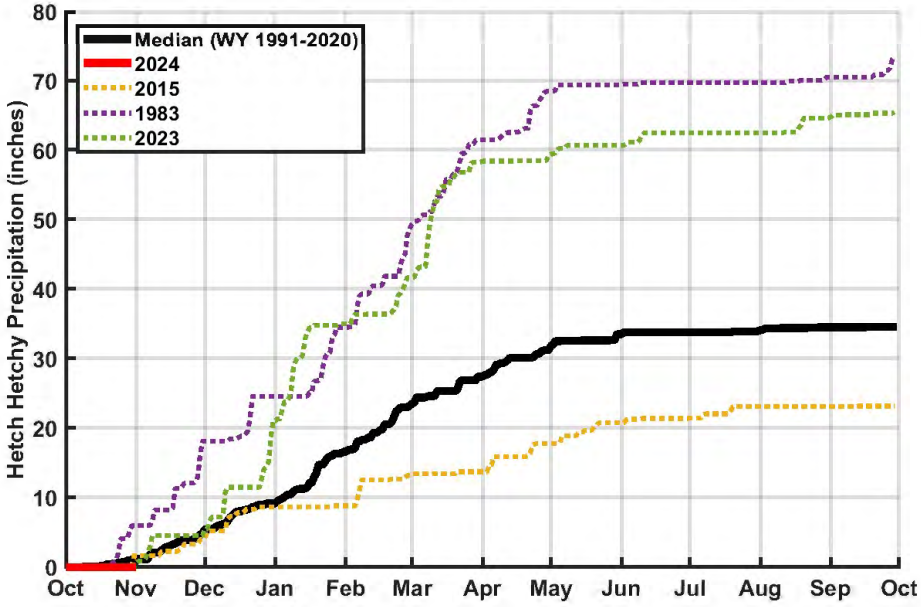


Figure 3: Water Year 2024 cumulative precipitation measured at Hetch Hetchy Weather Station. Median cumulative precipitation measured at Hetch Hetchy Weather Station and example wet and dry years are included with Water Year 2024 for comparison purposes.

Tuolumne Basin Unimpaired Inflow

Unimpaired inflow to SFPUC reservoirs and the Tuolumne River at La Grange for October 2023 and Water Year 2024 is summarized below in Table 2.

Table 2. Calculated reservoir inflows and Water Available to City

* All flows are in acre-feet	October 2023				October 1, 2023 through November 1, 2023			
	Observed Flow	Median[1]	Mean[1]	Percent of Mean	Observed Flow	Median[1]	Mean[1]	Percent of Mean
Inflow to Hetch Hetchy Reservoir	1,823	2,653	7,105	26%	1,823	2,653	7,105	26%
Inflow to Cherry Reservoir and Lake Eleanor	143	2,862	7,668	2%	143	2,862	7,668	2%
Tuolumne River at La Grange	18,434	10,873	20,887	88%	18,434	10,873	20,887	88%
Water Available to City	0	0	5,648	0%	0	0	5,648	0%

[1]Hydrologic Record: 1991-2020

Hetch Hetchy System Operations

Water deliveries via the San Joaquin Pipeline (SJPL) decreased on October 4th from 208 MGD to 175 MGD and remained there for the rest of the month.

Hetch Hetchy Reservoir power draft and stream releases during the month totaled 22,318 acre-feet. Hetch Hetchy Reservoir required minimum instream release for October was 60 cfs. As of October 1, WY 2023 total inflow volume has kept Hetch Hetchy Reservoir instream releases at a Type A (median to wet) year. Required minimum instream release is 60 cfs for November.

Cherry Reservoir power draft and stream releases totaled 2,275 acre-feet for the month of October. The required minimum instream release from Cherry Reservoir for October was 5 cfs. Required minimum instream releases are 5 cfs for the rest of the calendar year.

Lake Eleanor required minimum instream release for October was 10 cfs. Required instream releases for November will be 5 cfs and will remain there for the rest of the calendar year.

Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant was off-line with 0 MGD production rate for October. The Sunol Valley Water Treatment Plant production for the month was 34 MGD.

Regional System Water Delivery

The average October delivery rate was 199 MGD which is a 6% decrease below the September delivery rate of 211 MGD.

Local Precipitation

The rainfall summary for October 2023 and Water Year 2024 is presented in Table 3.

Table 3
Precipitation Totals at Three Local Area Reservoirs

Weather Station Location	October 2023		October 1, 2023 through October 31, 2023	
	Total (inches)	Percent Mean for the Month (inches)	Total (inches)	Percent of Mean for the Year-To-Date
Pilarcitos Reservoir	1.10	89%	1.10	89%
Lower Crystal Springs Reservoir	0.29	41%	0.29	41%
Calaveras Reservoir	0.24	50%	0.24	50%

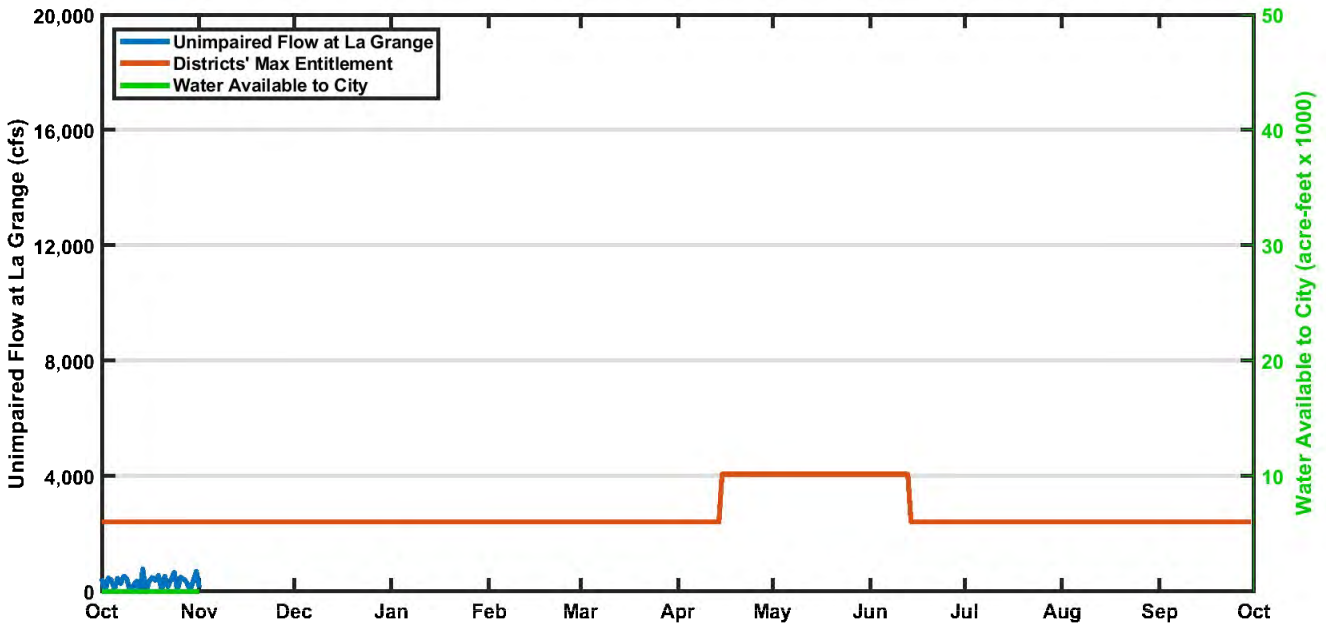
*Mean Period = WY 1991-2020

Water Supply and Planned Water Supply Management

Water Year 2024 has had a mild start with the only substantial precipitation occurring in early November. This has resulted in no Water Available to the City (WAC) for WY2024 to date (Figure 4).

Hetch Hetchy Reservoir is drafting via minimum required streamflow releases and power generation for water deliveries. Cherry Reservoir is drafting via minimum required streamflow releases to manage seasonal reservoir storage targets. Holm Powerhouse generation will be minimized this fall to maintain storage for power generation later this year. Lake Eleanor is drafting via minimum required streamflow releases. The Cherry-Eleanor pumps were removed from service in late October with a month total transfer of 4,590 acre-feet pumped from Lake Eleanor Reservoir into Cherry Reservoir.

Water Bank has remained full throughout October as reservoir inflows are exceed by instream releases. This trend is expected to continue in November.



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