San Francisco Public Utilities Commission
Hydrological Conditions Report
March 2024

B. Barry, C. Graham, H. Forrester, N. Waelty

Prepared April 10, 2024

The 2024 Winter Shutdown lasted 106 days—one of the longest planned water delivery interruptions in the history of the Hetch Hetchy project. These extended annual Winter Shutdowns and associated projects are planned through 2028. Some of the projects and their associated pictures include Mountain Tunnel lining repairs (left); installation of a removable spool piece at Tesla Valve House (top center); installation of a crossover knife gate at Pelican Valve House (bottom center); lowering a new knife gate at O'Shaughnessy Dam Diversion Tunnel (right).

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, 2024

	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]	293,312		340,830		47,518		86%
Cherry Reservoir[2]	241,967		268,811		26,844		90%
Lake Eleanor[3]	22,425		22,425		0		100%
Water Bank	570,000		570,000		0		100%
Tuolumne Storage	1,127,704		1,202,066		74,362		94%
Local Bay Area Storage							
Calaveras Reservoir	92,669	30,196	96,670	31,500	4,001	1,304	96%
San Antonio Reservoir	50,582	16,482	52,506	17,109	1,924	627	96%
Crystal Springs Reservoir	45,622	14,866	68,743	22,400	23,121	7,534	66%
San Andreas Reservoir	13,810	4,500	18,898	6,158	5,088	1,658	73%
Pilarcitos Reservoir	2,602	848	3,118	1,016	516	168	84%
Total Local Storage	205,285	66,892	239,936	78,183	34,651	11,291	86%
Total System	1,332,989		1,442,002		109,013		92%

[1] Maximum Hetch Hetchy Reservoir storage with drum gates deactivated.
[2] Maximum Cherry Reservoir storage with flash-boards removed.
[3] Maximum Lake Eleanor storage with flashboards removed and 1 board in the log chute.

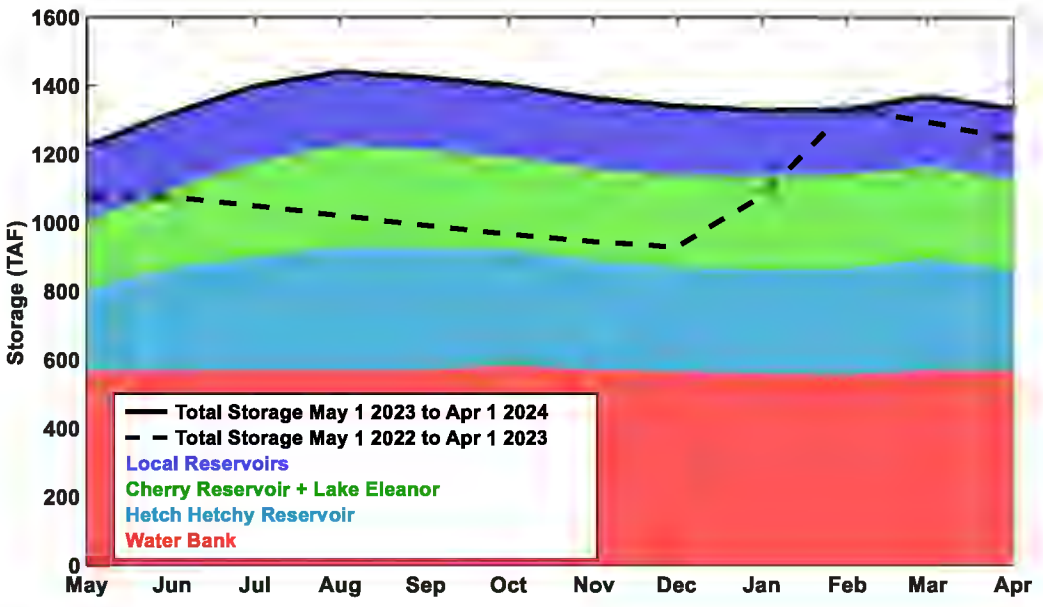

Figure 1: Local and Upcountry Reservoir storage. Color bands show contributions to total system storage. Solid black line shows total system storage for the past 12 months. Dashed black line shows total system storage the previous 12 months.

Hetch Hetchy System Precipitation Index

Current Month: The March 2024 six-station precipitation index was 7.18 inches, which is 131% of the 1991-2020 March median.

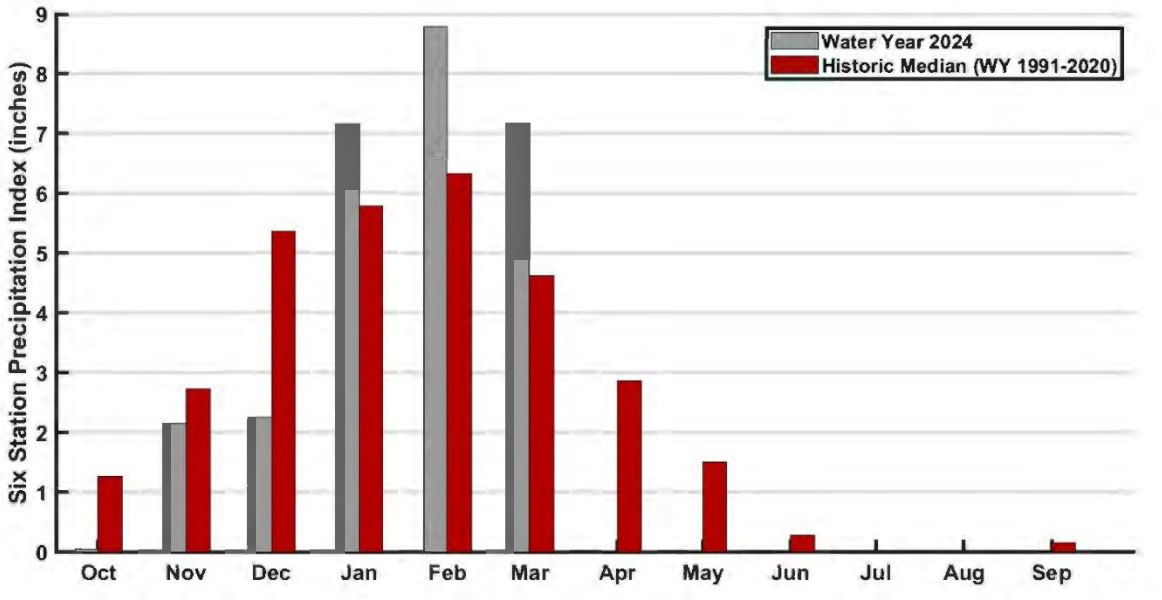

Figure 2: Monthly distribution of the six-station precipitation index relative to the monthly precipitation medians as of April 1. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

Cumulative Precipitation to Date: The cumulative six-station precipitation index for Water Year (WY) 2024 is 27.6 inches, which is 106% of the median to date. The Hetch Hetchy Weather Station received 6.52 inches of precipitation in March resulting in a total of 24.62 inches for WY 2024, or 85% of median for the Water Year to date. The cumulative WY 2024 Hetch Hetchy Weather Station precipitation is shown in Figure 3 in red.

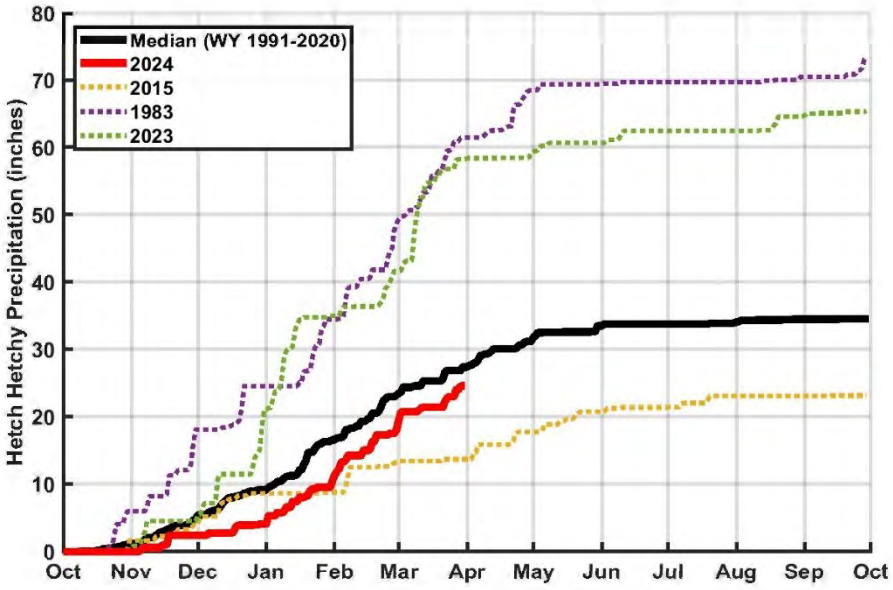

Figure 3: Water Year 2024 cumulative precipitation measured at Hetch Hetchy Weather Station as of April 1. Median cumulative precipitation measured at Hetch Hetchy Weather Station and example wet and dry years are included with Water Year 2024 for comparison purposes.

Tuolumne Basin Unimpaired Inflow

Unimpaired inflow to SFPUC reservoirs and the Tuolumne River at La Grange for March 2024 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	March 2024				October 1, 2023 through April 1, 2024			
	Observed Flow	Median[1]	Mean[1]	Percent of Mean	Observed Flow	Median[1]	Mean[1]	Percent of Mean
Inflow to Hetch Hetchy Reservoir	37,105	43,608	51,029	73%	82,275	122,770	145,672	56%
Inflow to Cherry Reservoir and Lake Eleanor	44,884	52,608	54,863	82%	114,152	157,675	172,787	66%
Tuolumne River at La Grange	234,803	209,444	231,643	101%	546,704	538,755	684,849	80%
Water Available to City	88,663	75,668	98,048	90%	140,893	152,587	285,970	49%

[1]Hydrologic Record: 1991-2020

Hetch Hetchy System Operations

Water deliveries via the San Joaquin Pipeline (SJPL) increased to 151 MGD on March 21 and remained there for the rest of the month.

Hetch Hetchy Reservoir power draft and stream releases during the month totaled 68,134 acre-feet. Hetch Hetchy Reservoir required minimum instream release for March was 50 cfs. Required minimum instream release increased to a type-A schedule for April and is 75 cfs.

Cherry Reservoir power draft and stream releases totaled 38,231 acre-feet for the month of March. The required minimum instream release from Cherry Reservoir for March was 5 cfs. Instream release requirements will remain at 5 cfs until July 1.

Lake Eleanor required minimum instream release for March was 10 cfs. Required instream releases is 10 cfs for April 1-14 and 20 cfs April 15-September 15.

Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant production for March was 45 MGD, the Sunol Valley Water Treatment Plant production for the month was 74 MGD.

Regional System Water Delivery

The average March delivery rate was 161 MGD which is an 6.6% increase above the February delivery rate of 151 MGD.

Local Precipitation
The rainfall summary for March 2024 and Water Year 2024 is presented in Table 3.

Table 3
Precipitation Totals at Three Local Area Reservoirs

Weather Station Location	March 2024		October 1, 2023 through April 1, 2024	
	Total (inches)	Percent Mean for the Month (inches)	Total (inches)	Percent of Mean for the Year-To-Date
Pilarcitos Reservoir	6.77	140%	39.10	131%
Lower Crystal Springs Reservoir	6.33	198%	29.29	148%
Calaveras Reservoir	3.98	127%	21.64	135%

*Mean Period = WY 1991-2020

Snowpack, Water Supply and Planned Water Supply Management
Above average precipitation and seasonally cold temperatures January through March increased the snowpack substantially (Figure 5) and increased seasonal water supply forecasts (Figure 6).

Cumulative Water Available to the City for WY 2024 was 140,893 acre-feet on April 1 (Figure 4). Forecasted inflows above and below SFPUC storage reservoirs (Figure 6) will maintain a full Water Bank throughout the runoff period and allow for filling of Cherry Reservoir, Lake Eleanor and Hetch Hetchy Reservoir.

Due to current reservoir storage, hydrologic conditions, and robust inflow forecasts (Figure 6) Hetch Hetchy Reservoir is drafting via minimum instream releases and Kirkwood Powerhouse Draft, which is scheduled at maximum available generation. Cherry Reservoir is drafting via minimum instream releases and Holm Powerhouse Draft, which is scheduled at near-maximum available generation. Scheduled Holm Powerhouse generation is reducing Cherry Reservoir storage to accommodate runoff through the spring. Lake Eleanor is full and spilling and drafting via pumping.

Discretionary valve releases from Hetch Hetchy Reservoir to the Tuolumne River are planned to occur during Spring months, as inflows are forecast to exceed the volume needed to fill the reservoir and for maximum available Kirkwood Powerhouse Draft. SFPUC staff are working with Yosemite National Park staff to plan these releases in the most environmentally beneficial manner, as part of the Upper Tuolumne River Ecosystem Program (UTREP).

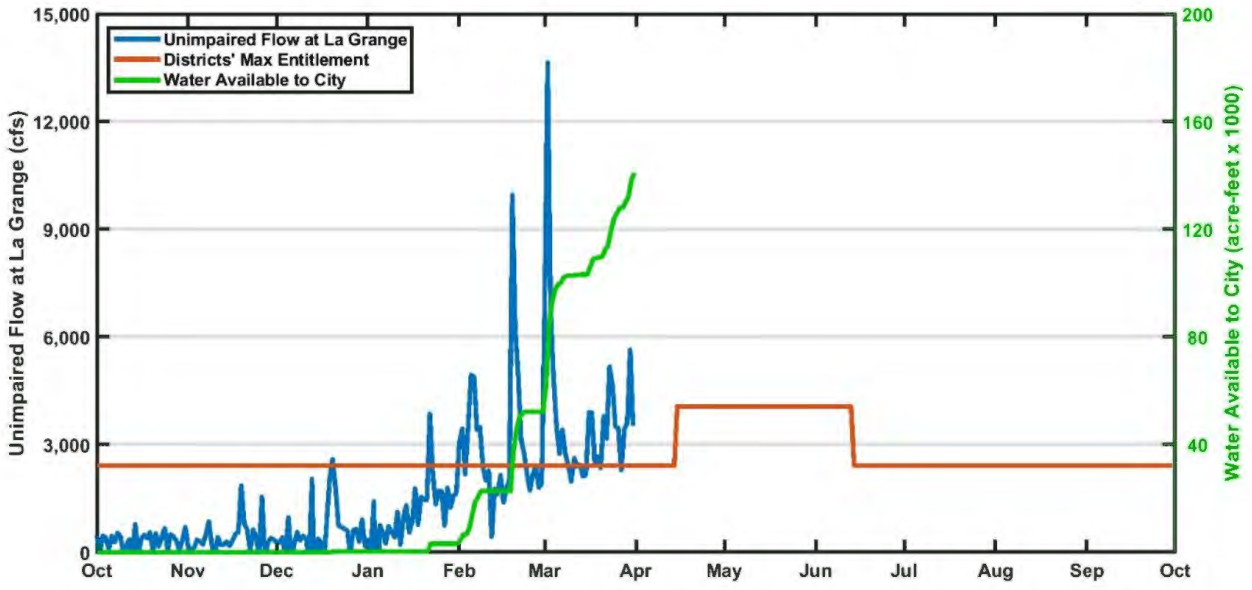

Figure 4: Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City.

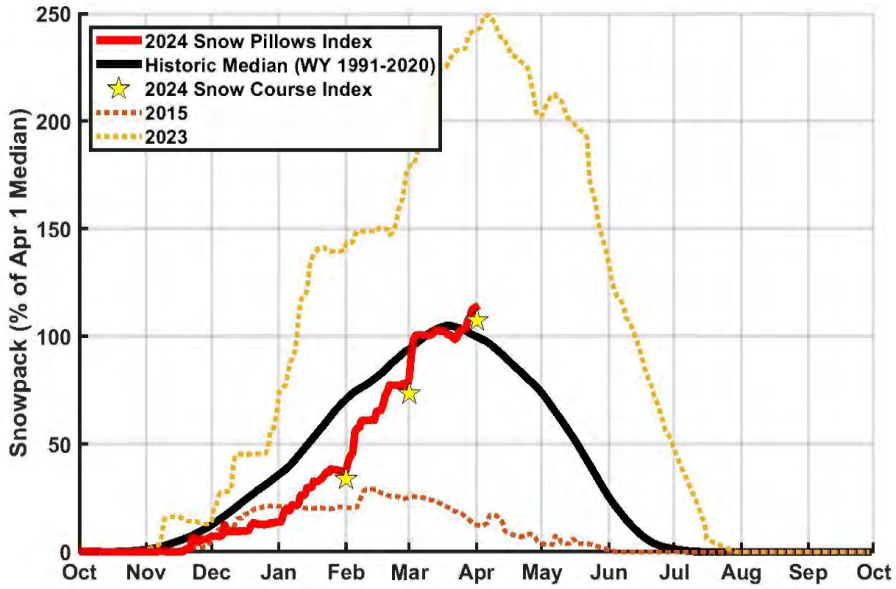

Figure 5: Tuolumne River Basin 10 Station Snow Index as of March 1 (red line), based on real time snow pillow Snow Water Equivalent (SWE) measurements in the Tuolumne Basin. Star indicates the average manual snow course measurements in the Tuolumne Watershed. Median Index and example wet and dry years are included with Water Year 2024 for comparison purposes.

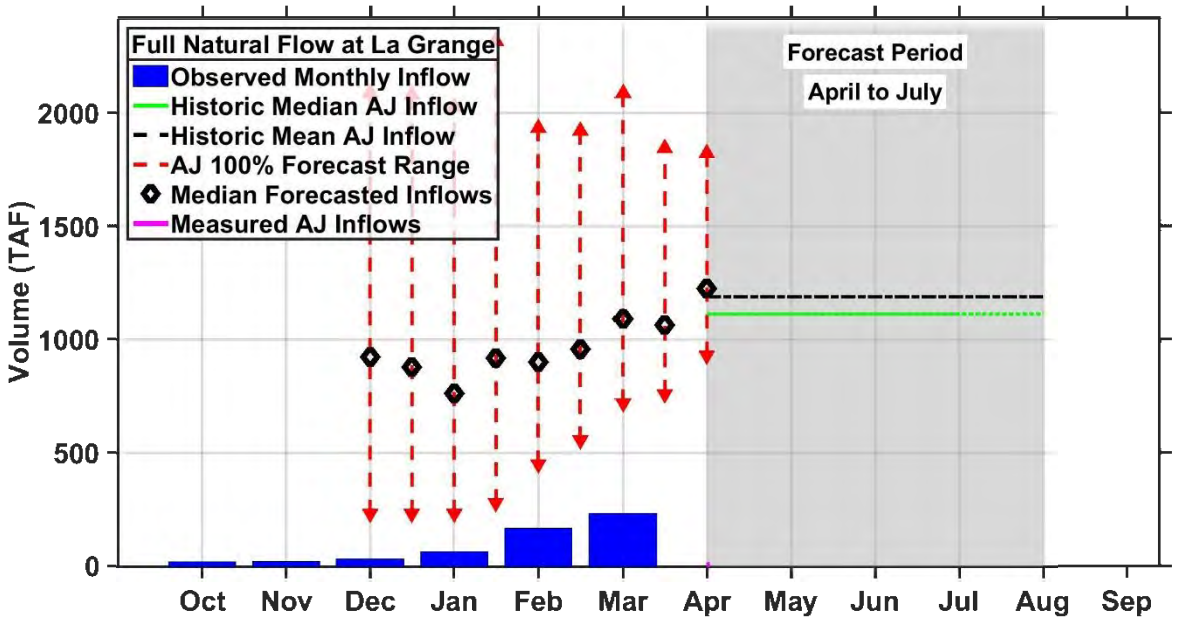

Figure 6: Water Supply Forecast Model of runoff (April to July) on the Tuolumne River at La Grange. This model is driven by precipitation from October to February, and by snow survey data from February through June. The forecast range decreases as time passes due to reduced potential future precipitation.

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Prepared May 9, 2024

Staff from Hetch Hetchy Water and Power, a Division of the San Francisco Public Utilities Commission, and other cooperating agencies conducted the last manual snow surveys of the year in late April. Snow surveys in the Tuolumne River Watershed occur at elevations as low as 6,500 feet (upper left) and as high as 9,000 feet (upper right). These measurements are performed with helicopter support (lower left), and by foot and skis (upper left, lower right). May 1 snow survey data indicate year-to-date snow water equivalent (SWE) around 90% of normal.

System Storage

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Table 1. Current System Storage as of May 1, 2024

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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]	312,814		360,360		47,546		87%
Cherry Reservoir[2]	256,329		273,345		17,016		94%
Lake Eleanor[3]	24,100		27,100		3,000		89%
Water Bank	570,000		570,000		0		100%
Tuolumne Storage	1,163,243		1,230,805		67,562		95%
Local Bay Area Storage							
Calaveras Reservoir	94,344	30,742	96,670	31,500	2,326	758	98%
San Antonio Reservoir	50,993	16,616	52,506	17,109	1,513	493	97%
Crystal Springs Reservoir	48,283	15,733	68,743	22,400	20,460	6,667	70%
San Andreas Reservoir	13,899	4,529	18,898	6,158	4,999	1,629	74%
Pilarcitos Reservoir	2,612	851	3,118	1,016	506	165	84%
Total Local Storage	210,131	68,471	239,936	78,183	29,805	9,712	88%
Total System	1,373,374		1,470,741		97,367		93%

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

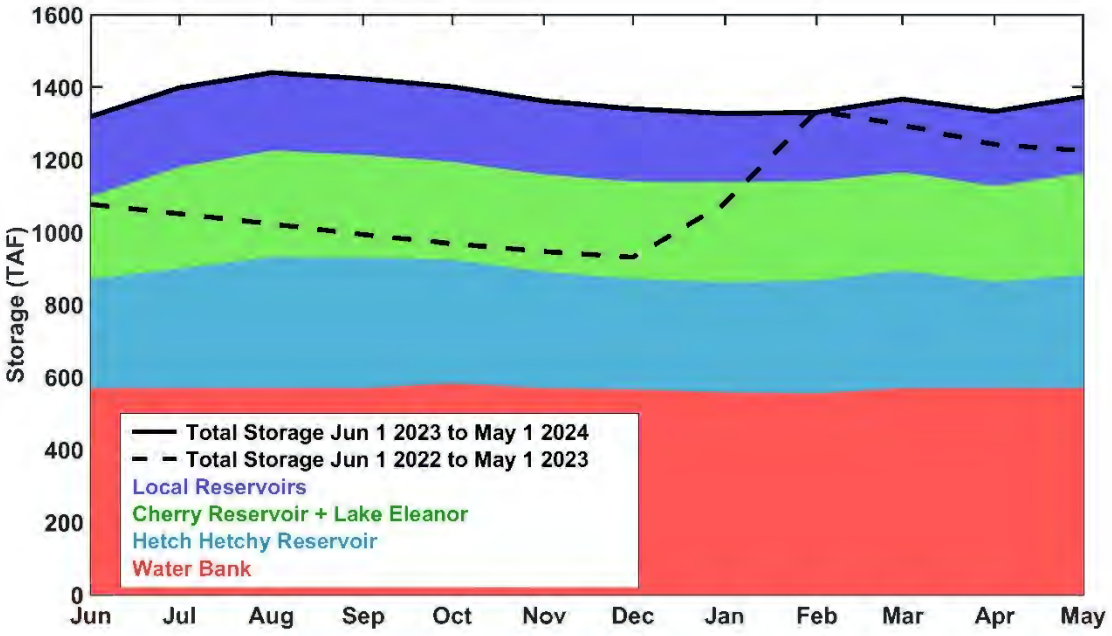


Figure 1: Local and Upcountry Reservoir storage. Color bands show contributions to total system storage. Solid black line shows total system storage for the past 12 months. Dashed black line shows total system storage the previous 12 months.

Hetch Hetchy System Precipitation Index

Current Month: The April 2024 six-station precipitation index was 2.8 inches, which is 98% of the 1991-2020 April median.

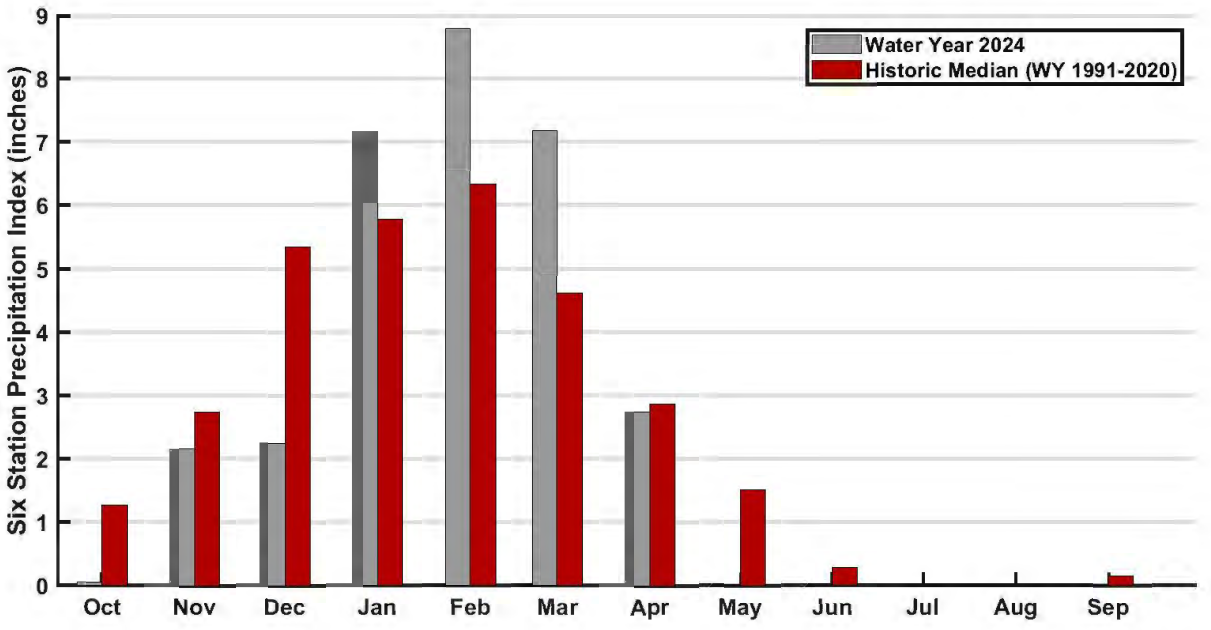
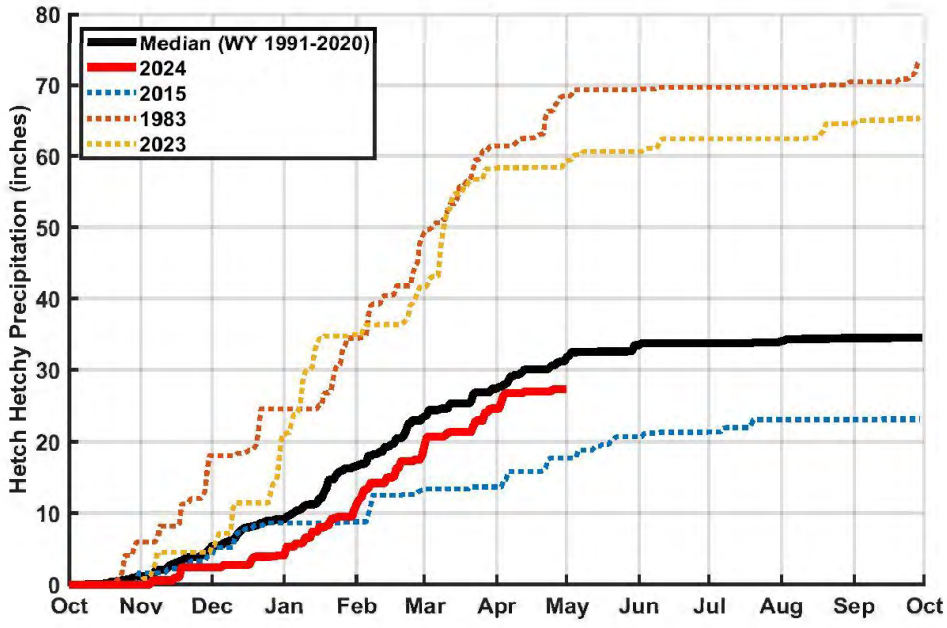


Figure 2: Monthly distribution of the six-station precipitation index relative to the monthly precipitation medians as of May 1. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

Cumulative Precipitation to Date: The cumulative six-station precipitation index for Water Year (WY) 2024 is 30.31 inches, which is 105% of the median to date. The Hetch Hetchy Weather Station received 2.73 inches of precipitation in April resulting in a total of 27.35 inches for WY 2024, or 86% of median for the Water Year to-date. The cumulative WY 2024 Hetch Hetchy Weather Station precipitation is shown in Figure 3 in red.



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Tuolumne Basin Unimpaired Inflow

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	Observed Flow	Median[1]	Mean[1]	Percent of Mean	Observed Flow	Median[1]	Mean[1]	Percent of Mean
Inflow to Hetch Hetchy Reservoir	117,628	99,383	102,046	115%	199,902	232,271	247,718	81%
Inflow to Cherry Reservoir and Lake Eleanor	112,520	85,278	84,860	133%	226,672	238,994	257,647	88%
Tuolumne River at La Grange	366,883	277,191	298,503	123%	913,586	803,288	983,352	93%
Water Available to City	171,040	92,777	116,214	147%	311,933	236,654	402,185	78%

[1]Hydrologic Record: 1991-2020

Hetch Hetchy System Operations

Water deliveries via the San Joaquin Pipeline (SJPL) increased from 151 MGD to 182MGD on April 19 and remained there for the rest of the month.

Hetch Hetchy Reservoir power draft and stream releases during the month totaled 98,501 acre-feet. Hetch Hetchy Reservoir required minimum instream release during April was 139 cfs. Required minimum instream release continued as a type-A schedule during April, 75 cfs, plus an additional 64 cfs due to elevated Kirkwood Powerhouse draft.

Cherry Reservoir power draft and stream releases totaled 53,153 acre-feet during the month of April. The required minimum instream release from Cherry Reservoir during April was 5 cfs. Instream release requirements will remain at 5 cfs until July 1.

Lake Eleanor required minimum instream release was 10 cfs during April 1-14 and 20 cfs during April 15-April 30. It will remain at 20 cfs until September 15.

Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant was offline during April, the Sunol Valley Water Treatment Plant production for the month was 29 MGD.

Regional System Water Delivery

The average April delivery rate was 182 MGD which is a 13% increase over the March delivery rate of 161 MGD.

Local Precipitation

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

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Weather Station Location	April 2024		October 1, 2023 through May 1, 2024	
	Total (inches)	Percent Mean for the Month (inches)	Total (inches)	Percent of Mean for the Year-To-Date
Pilarcitos Reservoir	2.20	75%	41.30	126%
Lower Crystal Springs Reservoir	1.69	97%	30.98	144%
Calaveras Reservoir	1.56	105%	23.20	132%

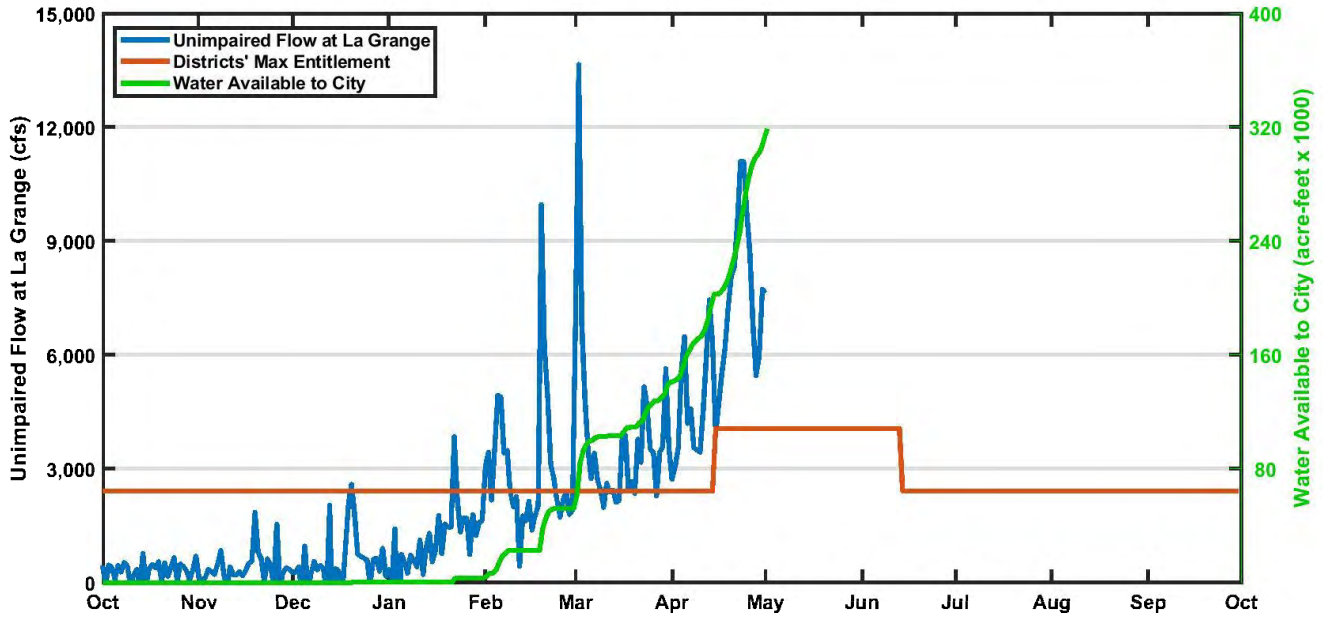
*Mean Period = WY 1991-2020

Snowpack, Water Supply and Planned Water Supply Management

Additional wet weather and seasonally cold temperatures in early April contributed to an already robust snowpack (Figure 5). Dry and warm conditions in the second half of April generated above average runoff (Table 2, Figure 4). Seasonal water supply forecasts predict near-historic median runoff for the April to July period (Figure 6).

Cumulative Water Available to the City for WY 2024 was 318,822 acre-feet on May 1 (Figure 4). Forecasted inflows above and below SFPUC storage reservoirs (Figure 6) will maintain a full Water Bank throughout the runoff period and allow for filling of Cherry Reservoir, Lake Eleanor and Hetch Hetchy Reservoir.

Hetch Hetchy Reservoir and Cherry Reservoir are drafting via discretionary valve releases and maximum available powerhouse draft as inflow forecasts exceed the volume needed to fill Hetch Hetchy and Cherry Reservoirs and provide maximum available powerhouse draft (Figure 6). SFPUC staff are working with Yosemite National Park staff to plan Hetch Hetchy valve releases in the most environmentally beneficial manner, as part of the Upper Tuolumne River Ecosystem Program (UTREP). Lake Eleanor is full and spilling.



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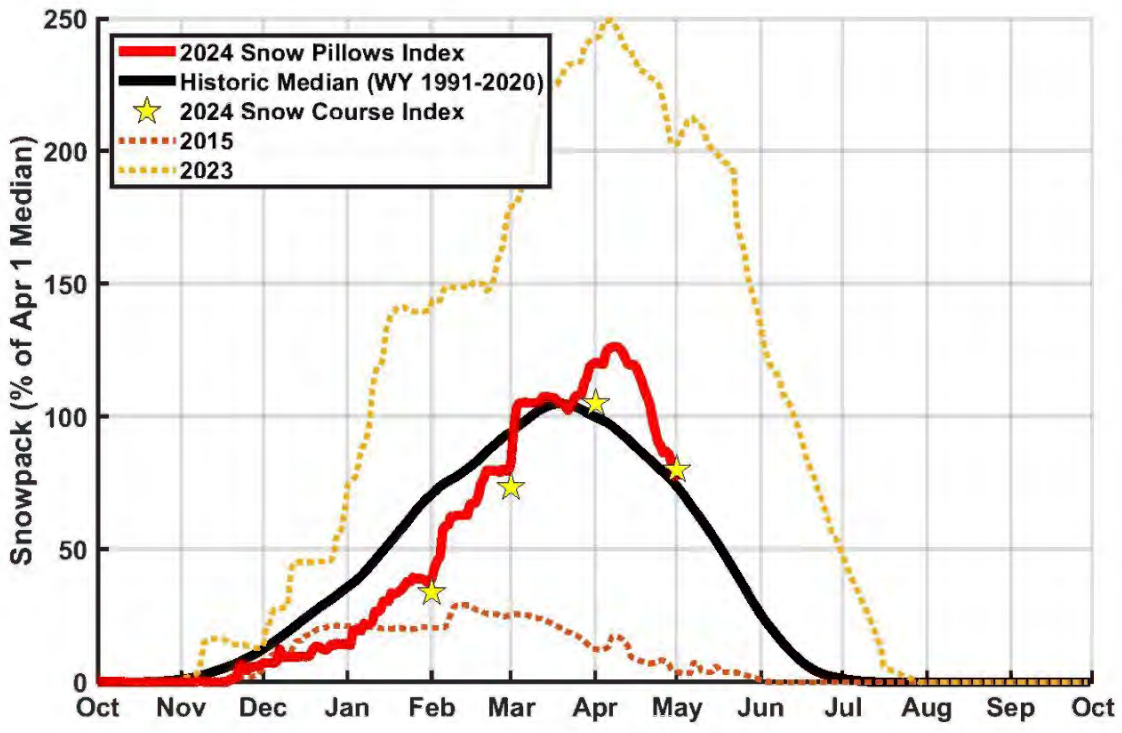

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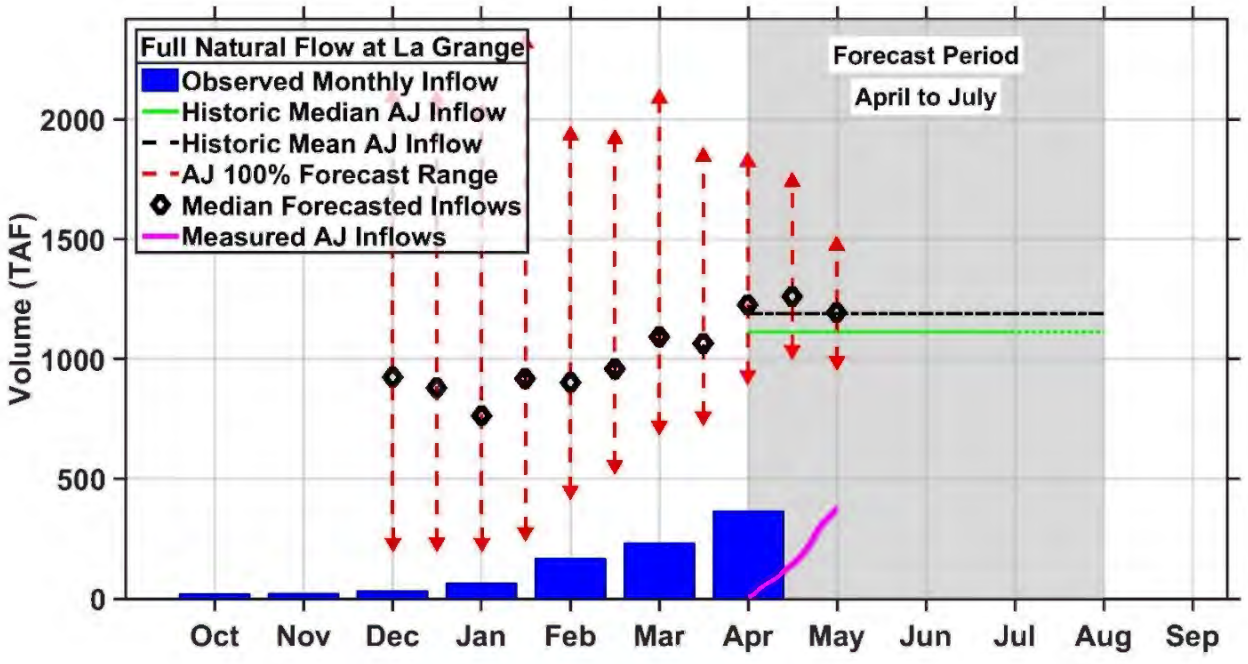

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