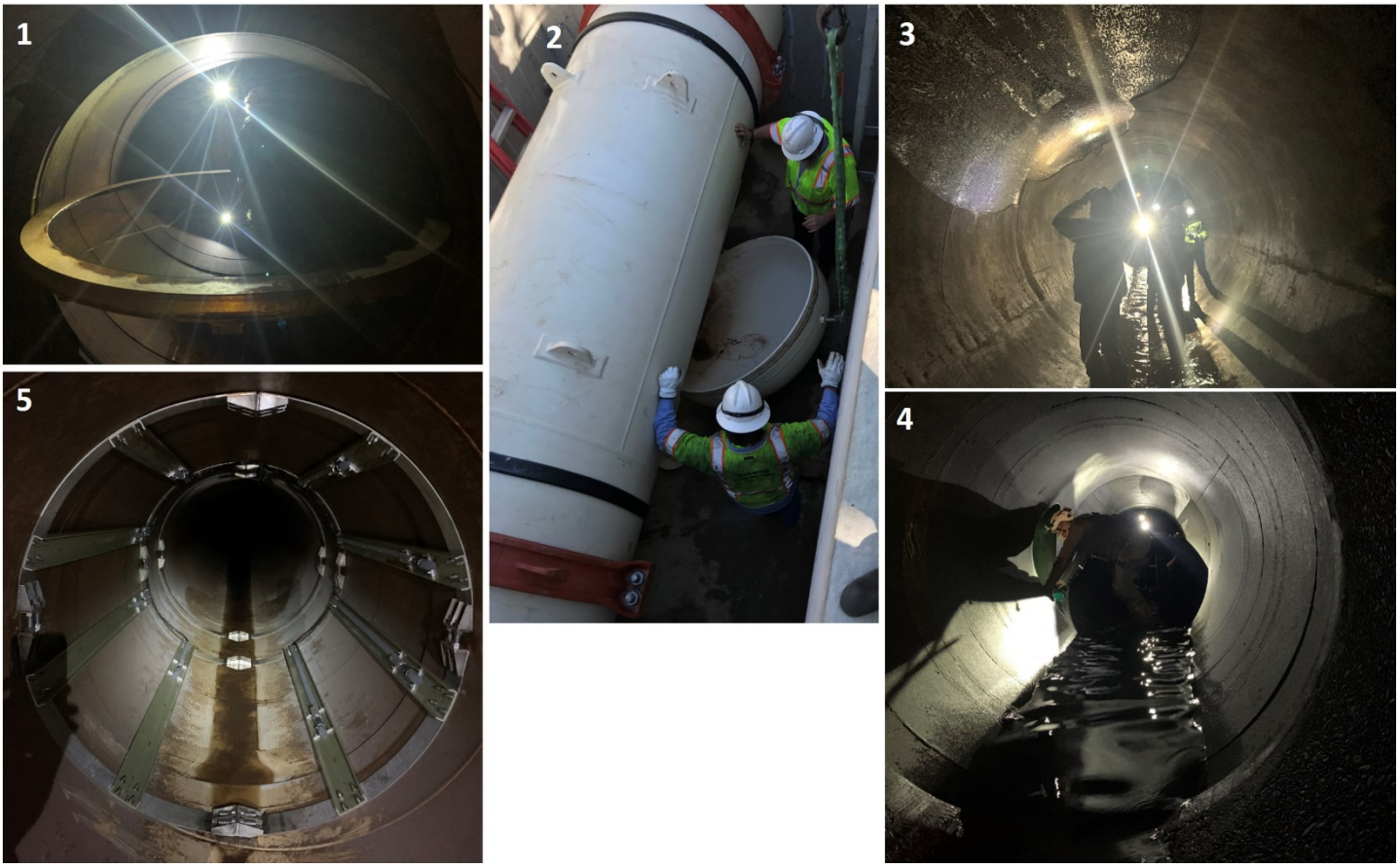
San Francisco Public Utilities Commission
Hydrological Conditions Report
February 2021

J. Chester, C. Graham, N. Waelty, March 10, 2021



Oakdale Portal (ODP) was a hub of activity during the Hetch Hetchy Water and Power (HHWP) 2021 Hetch Hetchy Aqueduct maintenance shutdown. Starting in the upper left corner and going clockwise:

1) Maintenance Engineering inspecting the SJPL 4 ODP isolation butterfly valve. HHWP inspected isolation butterfly valves in SJPL 1, 2, 3 and 4 at ODP. All valves were in good condition.
2) Plumbers and Mechanics installing a new removable spool piece (RSP) on SJPL 1. The RSP will allow for safe entry of the pipeline for repairs without an Aqueduct shutdown.
3) Maintenance Engineering and Water Operations and Maintenance staff inspecting an isolated section of failed mortar lining in the Foothill Tunnel. This lining will be repaired during the 2022 shutdown.
4) Maintenance Engineering inspecting the SJPL 2 Downstream Throttling Valve. Throttling valves in SJPL 2, 3 and 4 were inspected. The upstream throttling valve in SJPL 2 was removed from service for the year based on the condition assessment. It will be repaired in the 2022 shutdown.
5) The newly install ODP SJPL 4 sonic flow meter which replaced a nonfunctioning meter.

System Storage

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

Table 1
Current System Storage
as of March 1, 2021

	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]	194,466		340,830		146,364		57%
Cherry Reservoir[2]	194,577		268,810		74,233		72%
Lake Eleanor[3]	16,726		21,495		4,769		78%
Water Bank	536,563		570,000		33,437		94%
Tuolumne Storage	942,332		1,201,135		258,803		78%
Local Bay Area Storage							
Calaveras Reservoir	58,588	19,091	96,824	31,550	38,235	12,459	61%
San Antonio Reservoir	40,589	13,226	50,496	16,454	9,907	3,228	80%
Crystal Springs Reservoir	51,564	16,802	58,377	19,022	6,812	2,220	88%
San Andreas Reservoir	14,113	4,559	18,996	6,190	4,884	1,591	74%
Pilarcitos Reservoir	1,859	606	2,995	976	1,136	370	62%
Total Local Storage	166,713	54,323	227,688	74,192	60,974	19,868	73%
Total System	1,109,045		1,428,823		319,777		78%

[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.

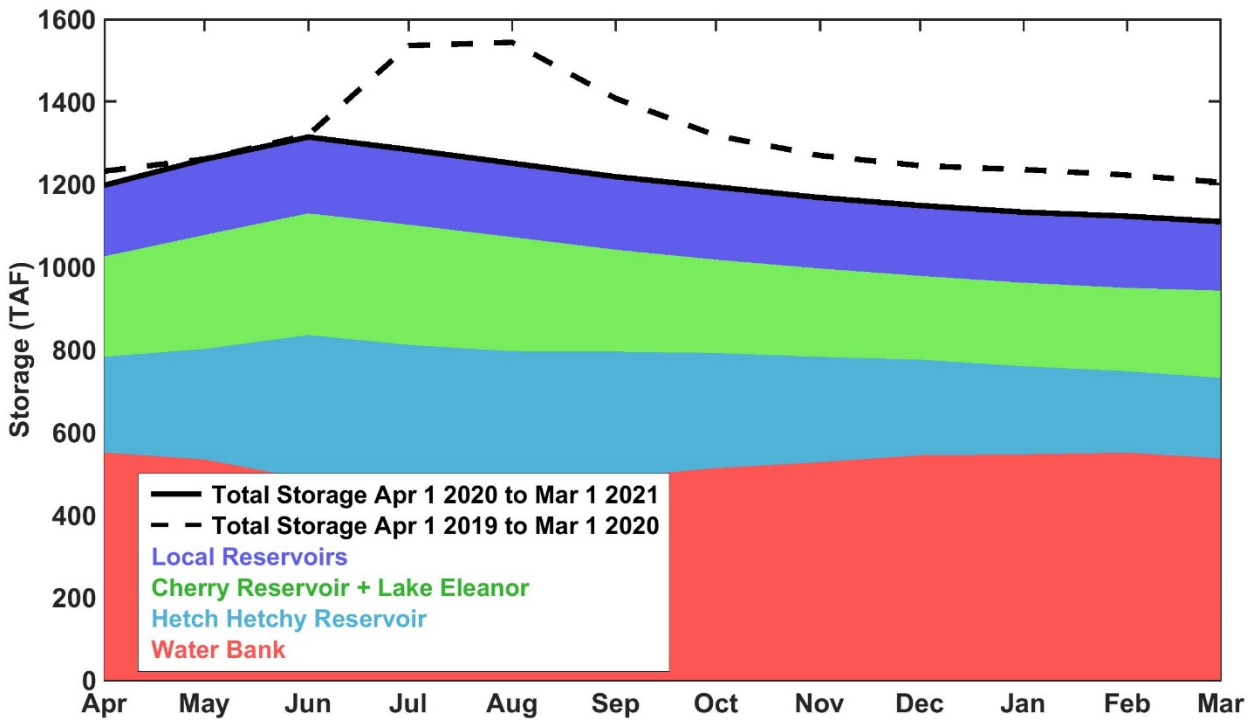


Figure 1: System storage for past 12 months in thousand acre-feet (TAF). Color bands show contributions to total system storage. Solid black line shows total system storage for the past 12 months. Dashed black line shows total system storage the previous 12 months.

Hetch Hetchy System Precipitation Index

Current Month: The February 2021 six-station precipitation index reported 1.95 inches of precipitation for the month, which is 32% of the average February. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

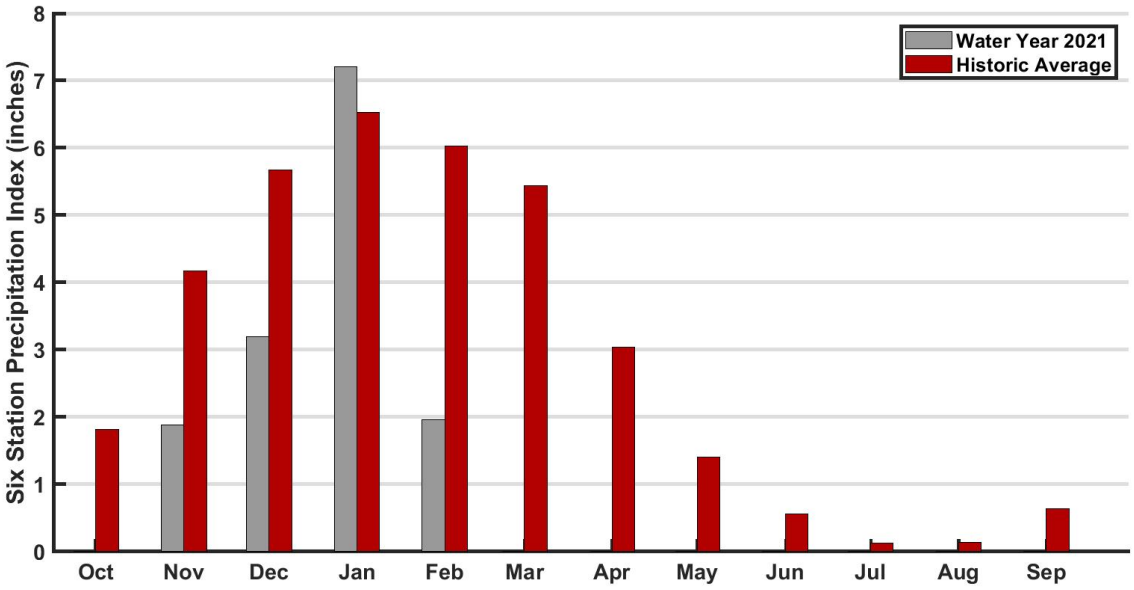


Figure 2: Monthly distribution of the six-station precipitation index relative to the monthly precipitation averages. The precipitation index is computed as the average of six Sierra precipitation stations and is an indicator of the overall basin wetness.

Cumulative Precipitation to Date: As of March 1, the six-station precipitation index for Water Year (WY) 2021 was 14.21 inches, which is 40% of the average annual water year total. The Hetch Hetchy Weather Station received 2.20 inches of precipitation in February for a total of 13.45 inches for WY 2021, or 58% of average to-date. The cumulative WY 2021 Hetch Hetchy precipitation is shown in Figure 3 in red.

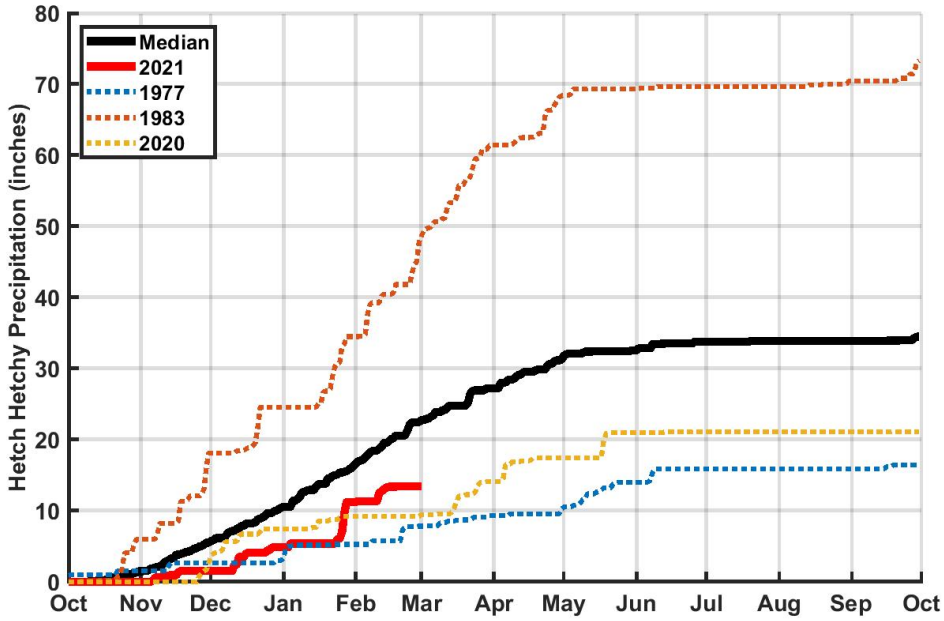


Figure 3: Water Year 2021 cumulative precipitation measured at Hetch Hetchy Weather Station. Median cumulative precipitation measured at Hetch Hetchy Weather Station and example wet and dry years are included with Water Year 2020 for comparison purposes.

Tuolumne Basin Unimpaired Inflow

Unimpaired inflow to SFPUC reservoirs and the Tuolumne River at La Grange for February 2021 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	February 2021				October 1, 2020 through February 28, 2021			
	Observed Flow	Median[1]	Mean[1]	Percent of Mean	Observed Flow	Median[1]	Mean[1]	Percent of Mean
Inflow to Hetch Hetchy Reservoir	12,855	21,665	24,894	52%	19,496	70,997	88,792	22%
Inflow to Cherry Reservoir and Lake Eleanor	16,762	22,803	26,411	63%	26,943	73,826	96,422	28%
Tuolumne River at La Grange	39,265	112,937	140,708	28%	77,314	312,576	410,464	19%
Water Available to City	0	20,399	53,518	0%	1,718	55,984	155,788	1%

[1]Hydrologic Record: 1919-2015

Hetch Hetchy System Operations

Hetch Hetchy Reservoir power draft and stream releases during the month totaled 15,701 acre-feet. Hetch Hetchy Reservoir minimum instream release requirements for February were 50 cfs. Total precipitation for Water Year 2021 has resulted in a Water Year Type C for Hetch Hetchy Reservoir. Hetch Hetchy Reservoir instream releases decreased to 35 cfs for March as the water year transitioned from Type B to Type C.

Cherry Reservoir valve and power draft releases totaled 6,787 acre-feet for the month and were used to maintain seasonal target elevations. The required minimum instream release from Cherry Reservoir for February was 5 cfs and will remain at that flow through June 2021. Lake Eleanor required minimum instream release was 5 cfs for February and will remain there through the end of March 2021 or when pumping resumes. The Cherry / Eleanor Pumps were shut down on December 31 and will remain off until spill occurs at Lake Eleanor.

Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant average production rate for February was 54 MGD. The Sunol Valley Water Treatment Plant production for the month was 49 MGD.

Local System Water Delivery

The average February delivery rate was 159 MGD, which is a 1% increase over the January delivery rate of 157 MGD.

Local Precipitation

The rainfall summary for February 2021 is presented in Table 3.

Table 3
Precipitation Totals at Three Local Area Reservoirs

Weather Station Location	February		October 1, 2020 through February 28, 2021	
	Total (inches)	Percent of Mean for the Month	Total (inches)	Percent of Mean for the Year-To-Date
Pilarcitos Reservoir	4.19	63 %	14.99	54%
Lower Crystal Springs Reservoir	2.46	50 %	9.68	50%
Calaveras Reservoir	1.41	36 %	7.66	50%

Snowpack, Water Supply and Planned Water Supply Management

Water Year 2021 started off remarkably dry. A relative change occurred when a prominent and large storm system in late January boosted the Upcountry snowpack to approximately 60% of the April 1st historical average (Figure 4). Modest precipitation and cold temperatures since then have only slightly increased the snowpack, although low-elevation snow in the 5,000 foot range still remains.

The lower than average snowpack has resulted in lower than average forecasts for seasonal inflows. The 2021 median runoff forecast is currently around 60% of average. While well below average, the forecasted inflows will be enough to refill all upcountry reservoirs. There will likely not be enough water to refill Water Bank. Hetch Hetchy Reservoir will be managed to fill in May or June, with any additional inflows being run through the Kirkwood and Moccasin Powerhouses. Cherry Reservoir and Lake Eleanor will be managed to fill in May or June, with some water transferred to Water Bank via power generation.

The calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City are shown in Figure 5. As of February 1, there has been 1,718 ac-ft water available to the City in Water Year 2021.

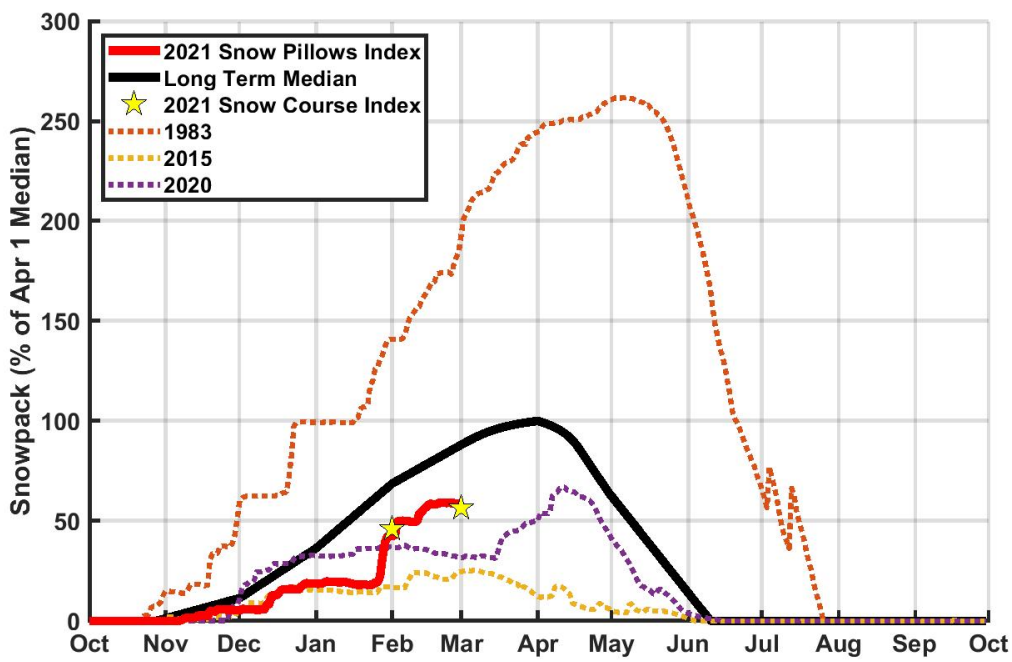


Figure 4: Tuolumne River Basin 10 Station Snow Index (lines), based on real time snow pillow SWE measurements. Also plotted is the mean monthly manual snow surveys (star) in the Tuolumne Basin.

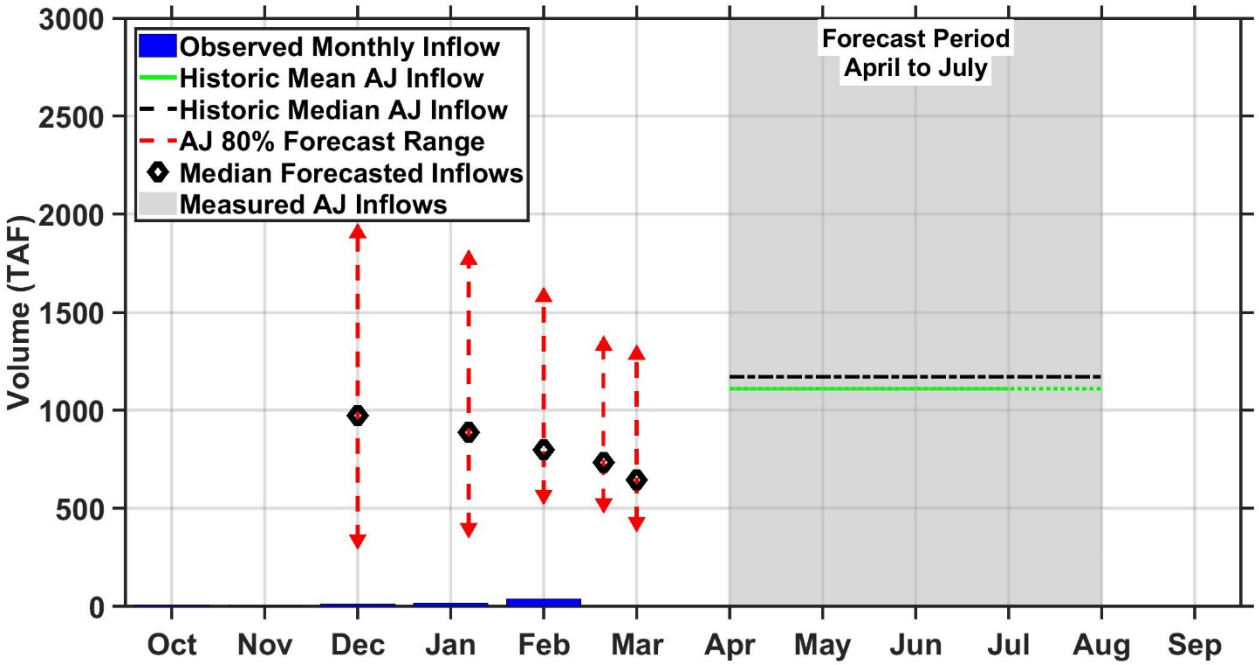


Figure 5: Forecasted April to July Full Natural Flow at La Grange (CCSF water rights). Sustained below average precipitation has resulted in a significant reduction in forecasted inflows. The median forecast is currently at around 60% of normal, roughly corresponding with the precipitation and snow to date.

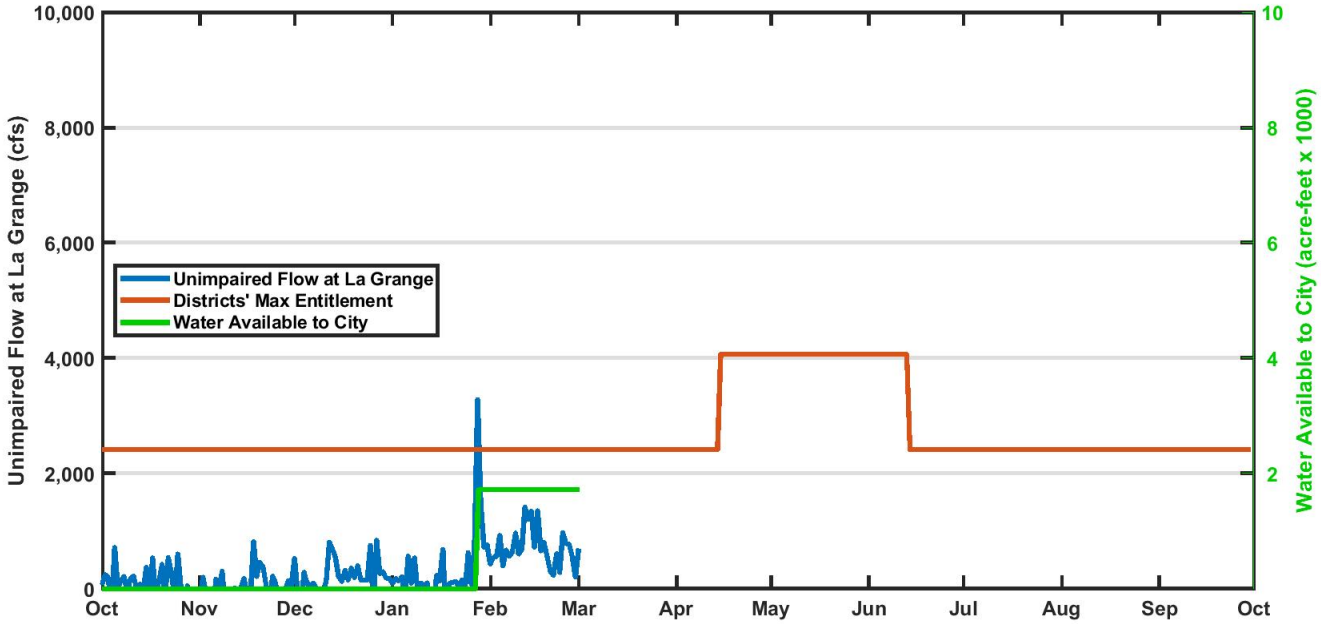


Figure 6: Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City.