San Francisco Public Utilities Commission
Hydrological Conditions Report
For April 2017

J. Chester, C. Graham, & M. Tsang, May 4, 2017

The O'Shaughnessy Dam Spillway is carved from the granite bedrock that makes up the valley walls in Hetch Hetchy Valley. The spillway has a capacity of 10,000 cfs. The drumgates along the reservoir side of the spillway control releases into the spillway. These drumgates can be raised and lowered to increase or decrease spillway flow as needed.

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

Table 1
Current Storage
As of May 1, 2017

Reservoir	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[1]	284,166		340,830		56,664		83.4%
Cherry[2]	181,940		268,810		86,870		67.7%
Lake Eleanor[3]	24,286		21,495		0		Full
Water Bank	570,000		570,000		0		Full
Tuolumne Storage	1,060,392		1,201,135		143,534		88.3%
Local Bay Area Storage							
Calaveras[4]	27,854	9,076	96,824	31,550	68,970	22,474	28.8%
San Antonio	45,869	14,947	50,496	16,454	4,627	1,508	90.8%
Crystal Springs	55,387	18,048	58,377	19,022	2,990	974	94.9%
San Andreas	18,390	5,992	18,996	6,190	606	198	96.8%
Pilarcitos	2,895	943	2,995	976	100	32	96.7%
Total Local Storage	150,395	49,006	227,688	74,192	77,293	25,185	66.1%
Total System	1,210,787		1,428,823		220,827		84.7%

[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.
[4] Available capacity does not take into account current DSOD storage restrictions.

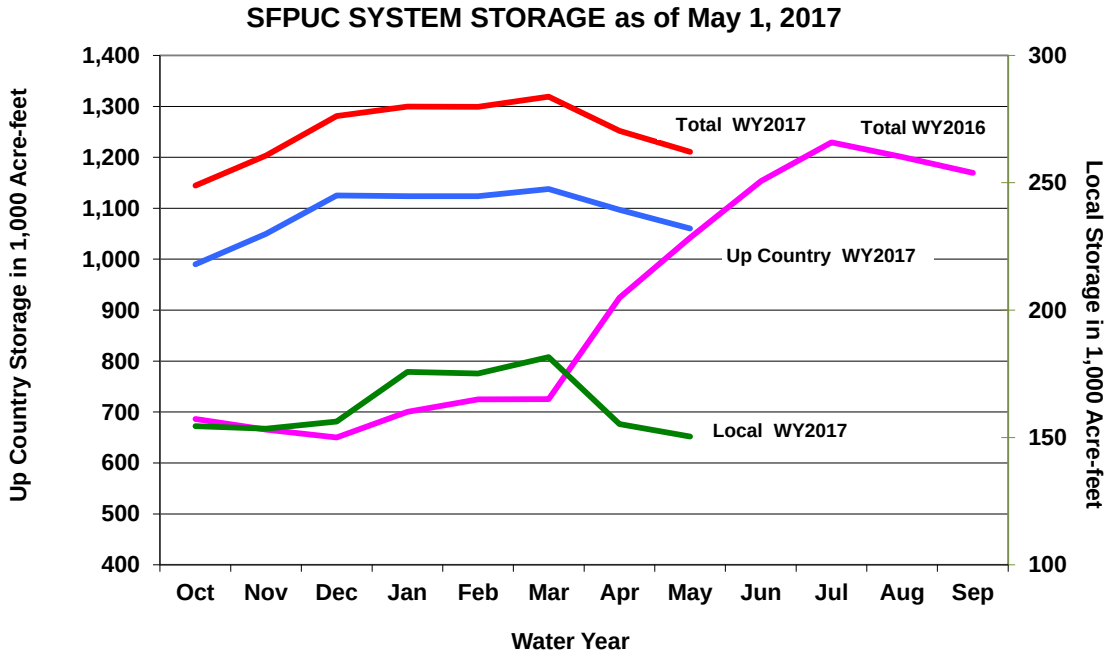

Figure 1: Monthly system storage for Water Year 2017

Hetch Hetchy System Precipitation Index [5]

Current Month: The April 2017 six-station precipitation index was 5.89 inches, or 192% of the average index for the month.

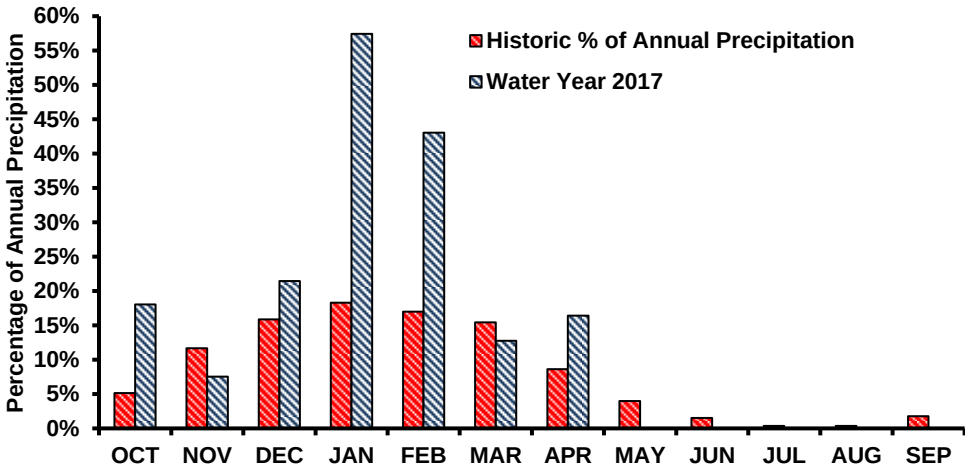

Figure 2: Monthly distribution of the Hetch Hetchy Six-station precipitation index as percent of the annual average precipitation.

Cumulative Precipitation to Date: The accumulated six-station precipitation index for water year 2017 is 63.9 inches, which is 179.5% of the average annual water year total, or 192.1% of average annual to date. Hetch Hetchy received 5.62 inches precipitation in April and a total of 62.1 inches for water year 2017. The cumulative Hetch Hetchy precipitation is shown in Figure 3 in red.

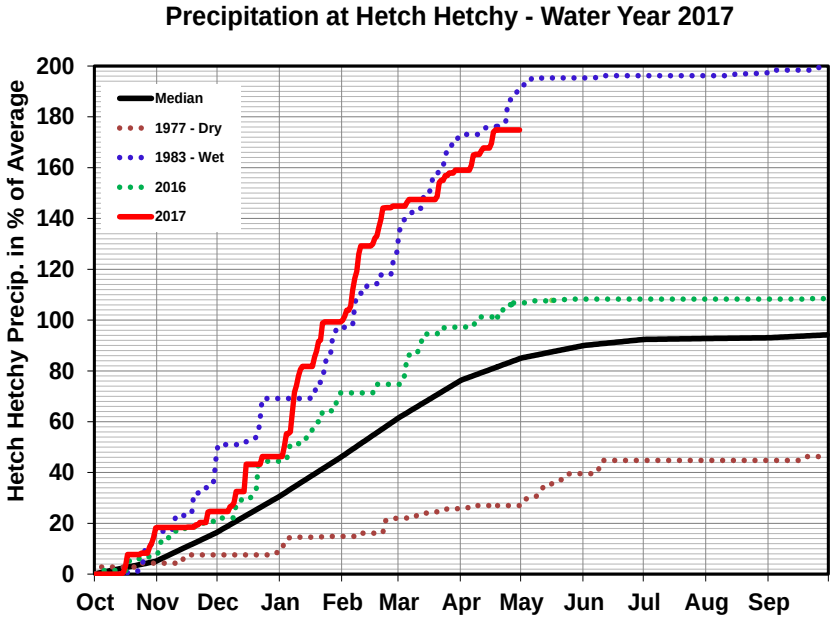

Figure 3: Water year 2017 cumulative precipitation measured at Hetch Hetchy Reservoir through April 30th, 2017. Precipitation at the Hetch Hetchy gauge for wet, dry, median, and WY 2016 are included for comparison purposes.

[5]The precipitation index is computed using six Sierra precipitation stations and is an indicator of the wetness of the basin for the water year to date. The index is computed as the average of the six stations and is expressed in inches and in percent.

Tuolumne Basin Unimpaired Inflow

Unimpaired inflow to SFPUC reservoirs and the Tuolumne River at La Grange as of April 30th, 2017 is summarized below in Table 2.

Table 1

Unimpaired Inflow (Acre-Feet)

	April 2017				October 1, 2016 through April 30, 2017			
	Observed Flow	Median[6]	Average[6]	Percent of Average	Observed Flow	Median[6]	Average[6]	Percent of Average
Inflow to Hetch Hetchy Reservoir	133,172	88,140	90,415	147.3%	558,254	204,241	220,781	252.9%
Inflow to Cherry Reservoir and Lake Eleanor	115,442	72,413	73,287	157.5%	582,362	197,337	211,960	274.8%
Tuolumne River at La Grange	525,203	262,613	273,556	192.0%	2,804,898	775,189	874,089	320.9%
Water Available to the City	329,078	82,697	96,413	341.3%	1,964,424	231,180	319,913	610.1%

[6] Hydrologic Record: 1920 – 2015

Hetch Hetchy System Operations

Draft and releases from Hetch Hetchy Reservoir during the month of April totaled 135,338 acre-feet to meet instream release requirements and reservoir management goals. Precipitation to date and inflows are sufficient to keep Hetch Hetchy Reservoir in Year Type A through June. Hetch Hetchy minimum instream release requirements for April were 75 cfs, and will be 100 cfs for May. Hetch Hetchy inflows have remained high through May, requiring additional valve releases to maintain storage within our seasonal targets (300,000-310,000 acre-feet). May generation and additional releases will be set to balance inflows, with the aim of maintaining Hetch Hetchy Reservoir storage within the seasonal targets.

99,604 acre-feet of draft was made from Cherry Reservoir during the month of April to meet instream release requirements and reservoir management goals. No water was transferred via pumping from Lake Eleanor to Cherry Reservoir in April. The required minimum instream release from Cherry Reservoir is 5 cfs through June. Required minimum release from Lake Eleanor is 20 cfs from April 14 through September 15. Cherry storage will be maintained below 248,000 acre-feet via power generation through May. Valve releases to minimize excessive spill at Lake Eleanor were made during the month of April and will continue through spring runoff.

Regional System Treatment Plant Production

The Harry Tracy Water Treatment Plant average production rate for April was 21 MGD. The Sunol Valley Water Treatment Plant average production for the month was 74 MGD.

Local System Water Delivery

The average April delivery rate was 165 MGD which is a 2% increase above the March delivery rate of 162 MGD.

Local Precipitation

April showers provided above average precipitation for the Bay Area, average precipitation fell in the south bay. The April rainfall summary is presented in Table 3.

Table 3
Precipitation Totals at Three Local Area Reservoirs for April 2017

Reservoir	Month Total (inches)	Percentage of Average for the Month	Water Year to Date [7] (inches)	Percentage of Average for the Year-to-Date [7]
Pilarcitos	4.51	156 %	62.00	166 %
Lower Crystal Springs	2.84	139 %	39.10	152 %
Calaveras	1.81	99 %	25.92	126 %

[7] WY 2017: Oct. 2016 through Sep. 2017.

Snowmelt and Water Supply

Continued storm events, mitigated by relatively warm weather, have resulted in a small net increase in snowpack conditions. Due to the warm weather, most of the snow accumulation has been at higher elevations, where we are seeing record snow depths and water content. Snow accumulation and precipitation have fallen below 1983 levels. Reservoir inflows have correspondingly been above average, maintaining reservoir storages at or above our seasonal targets for all of February. Increased releases from all reservoirs to manage storage levels resulted in full Water Bank from early January through the present.

With high current storage and a large snowpack, inflows will fill all reservoirs to operational storage targets by June/July and maintain full Water Bank through next fall. To manage reservoir storage levels, we anticipate powerdraft in excess of municipal load through the end of runoff. In addition, we expect valve releases and spill at Hetch Hetchy in the order of 700 to 900 TAF during the runoff season. At Cherry Lake, valve releases combined with full powerdraft at Holm PH will manage inflows.

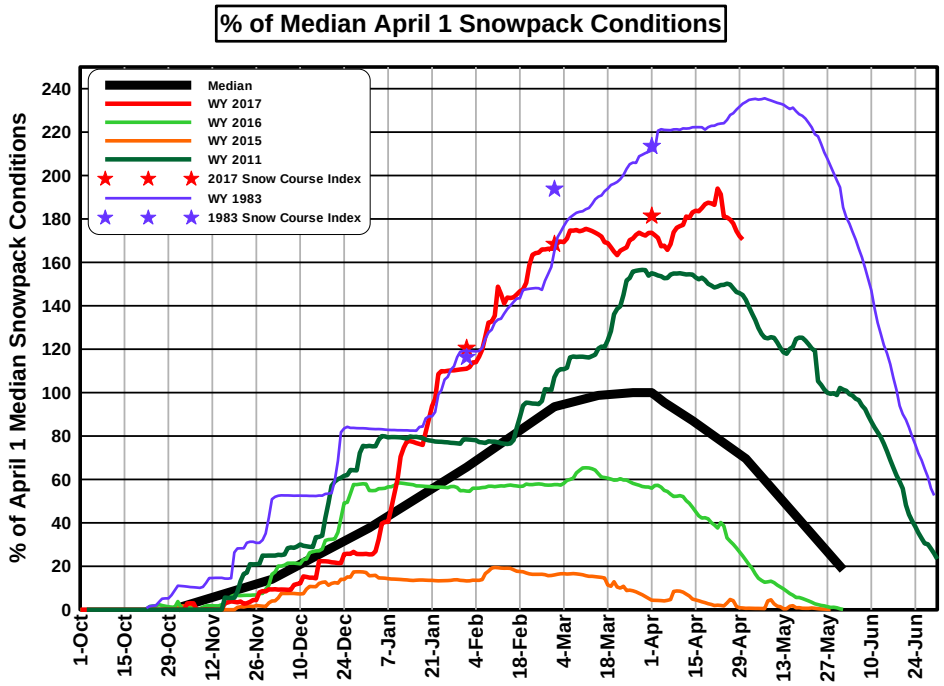

Figure 4: Snowpack conditions as of May 1. Current conditions are well above average to date, and above average seasonal maximum. Snow conditions are above peak 2011 accumulation, the most recent above average year. Snow surveys (red stars) agree with snow pillows (red line), indicating deep and widespread snow accumulation. 1983, the wettest year on record, is included for comparison.

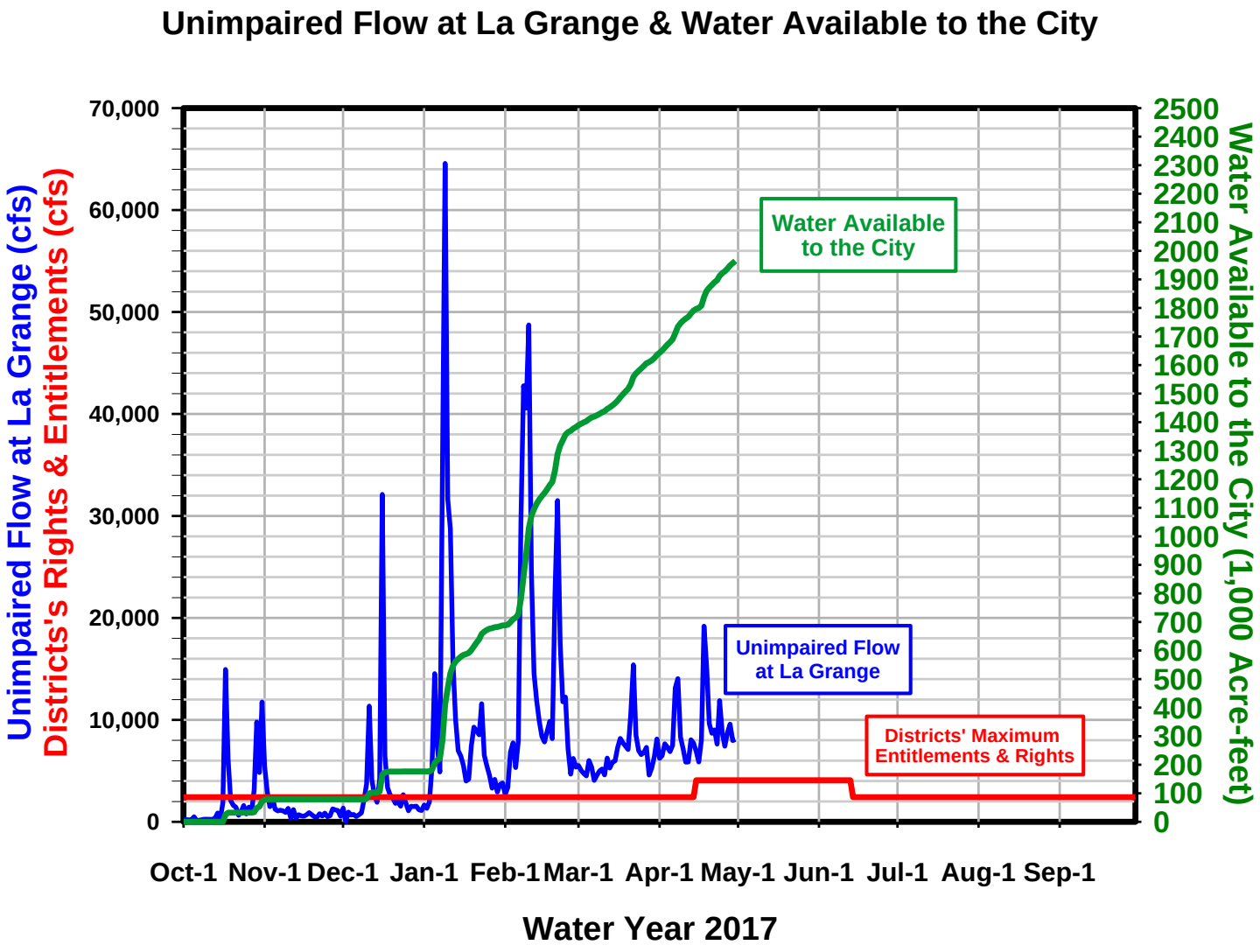

Figure 5: Calculated unimpaired flow at La Grange and the allocation of flows between the Districts and the City. 1,964,424 acre-feet of water has become available to the City during water year 2017. Inflows have exceeded the District Entitlements line since early January.