RAYMOND BASIN MANAGEMENT BOARD

ANNUAL REPORT

JULY 1, 2018 – JUNE 30, 2019

SEPTEMBER 2019

SANTA ANITA SUBAREA PROJECT – ORANGE GROVE MONITORING WELL

Celebrating 75 Years of Responsible Basin Management

MISSION STATEMENT

The Raymond Basin Management Board
is responsible for managing the current and future quality
and quantity of water resources for the benefit of
its members and the communities they serve.

FOREWORD

The Raymond Basin Management Board, as Watermaster, is pleased to submit this report on water supply conditions in the Raymond Basin during the 2018-19 fiscal year. It is prepared annually in accordance with the provisions of the Superior Court of California, County of Los Angeles Judgment in the City of Pasadena vs. City of Alhambra, et al., Case No. Pasadena C-1323.

The Watermaster utilizes the services of the Raymond Basin Staff, Stetson Engineers, and Geoscience Support Services Inc. to prepare the annual report. This report summarizes the Watermaster work, conditions of groundwater supply, water use, storage, groundwater replenishment, and gives a financial summary for the fiscal year.

The Raymond Basin Staff wishes to acknowledge and express appreciation for the assistance and support received from the public and private parties and the individuals whose contributions were essential to the preparation of this report.

WATERMASTER SERVICE IN THE RAYMOND BASIN

July 1, 2018 – June 30, 2019

September 2019

75th Anniversary

BOARD OF DIRECTORS

2018-19

Chris Burt, Chair
Kinneloa Irrigation District for Pasadena Subarea

Lisa Yamashita-Lopez, Vice Chair
Rubio Cañon Land & Water Association

Gary Takara, Secretary
City of Pasadena

Jose Reynoso, Treasurer
City of Sierra Madre

William Kimberling*
Las Flores Water Company for Monk Hill

Jim Prior
San Gabriel County Water District

Martin Ray
City of Alhambra

Thomas W. Tate
City of Arcadia

Jessica Taylor**
California-American Water Company

Ken Tcheng
Sunny Slope Water Company

Anthony C. Zampiello, Executive Officer
Assistant Secretary Treasurer

*William Kimberling appointed to fill position following the resignation of Bob Fan, Valley Water Company
**Jessica Taylor appointed by California American Water Company to fill Board seat vacated by Monica Na.

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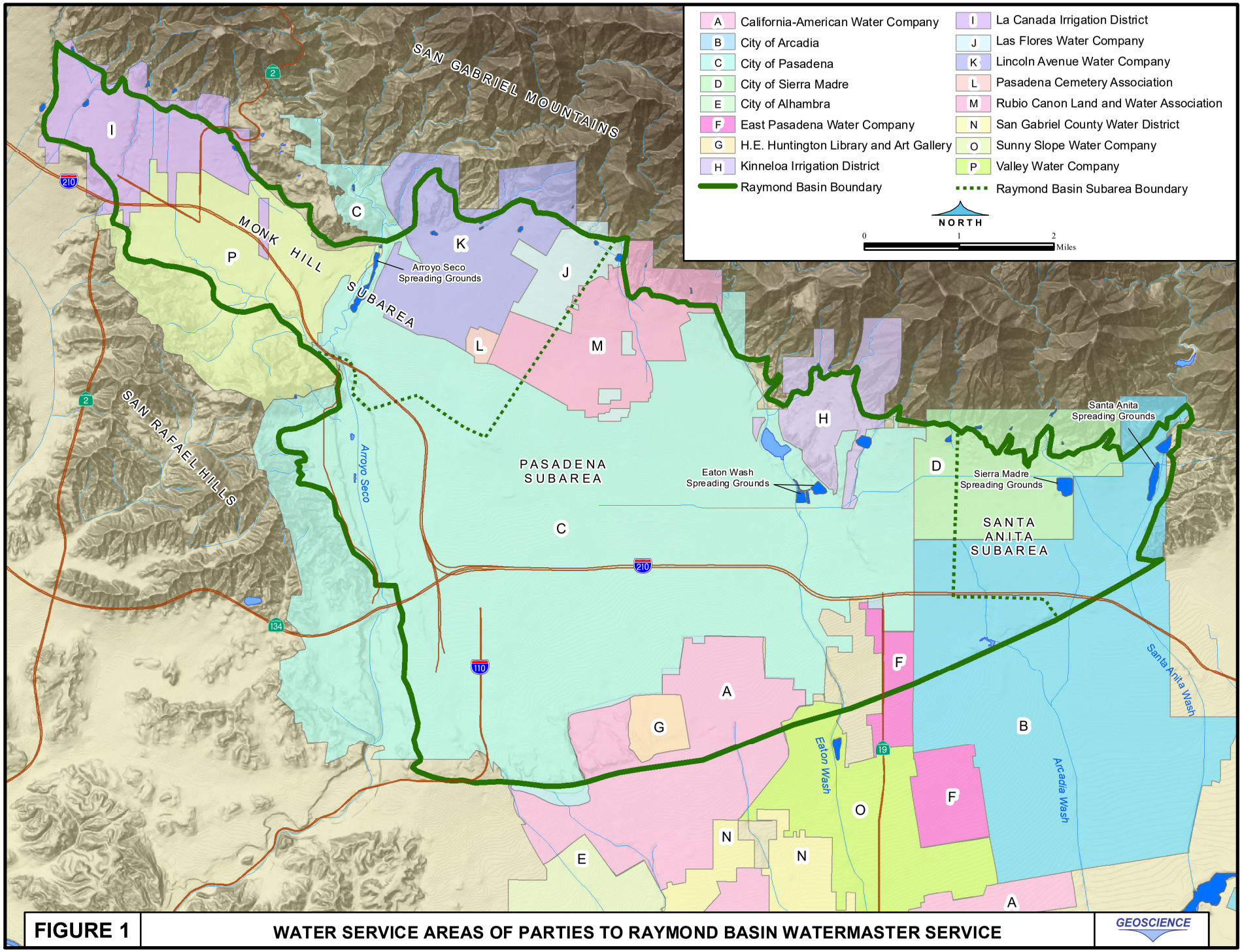


FIGURE 1 | **WATER SERVICE AREAS OF PARTIES TO RAYMOND BASIN WATERMASTER SERVICE** | GEOSCIENCE

SUMMARY OF WATER CONDITIONS AND OPERATIONS

On September 16, 2014, Governor Edmund G. Brown Jr. signed a three-bill package (AB 1739 -Dickenson, SB 1319 and SB 1168 -Pavley) known as the Sustainable Groundwater Management Act (SGMA). SGMA created a framework for sustainable, local groundwater management for the first time in California history, outside of court adjudicated basins.

In accordance with the stipulations in the California Water Code, the Raymond Basin Management Board staff, serving as Watermaster for the Raymond Basin, submitted a copy of the governing final judgment, including amendments, along with the annual report to the State of California Department of Water Resources (DWR) on March 28, 2019. Additionally, staff continues to comply with certain regulations within SGMA, which include reporting to DWR on groundwater elevation data, groundwater extractions, surface water supply, total water usage, and groundwater storage.

Summarized below, and in Tables 1 to 4, are highlights of operations for the current fiscal year. Details of the Basin operations and the historic and operational data follow these tables.

1. Precipitation (Tables 1 and 5; Figures 2, 3, and 4)

   Precipitation has increased from the previous year (29.53 inches during 2018-19 versus 9.87 inches during 2017-18), 137% percent of the 70-year average (21.48 inches).

   Water spread in the Basin increased from the prior year by approximately 374%. (8,844 acre feet during 2018-19 versus 1,867 acre feet during 2017-18).

2. Groundwater Levels Measured in October 2018 and April 2019 (Table 8; Figures 8-12)

   Although water levels have continued to fluctuate throughout the Basin, during the 2018-19 fiscal year, Basin levels appear to have been holding relatively steady with above average rainfall during FY 2018-19. However, Monk Hill, Santa Anita and the west central section of the Pasadena Subarea levels reflect a decline. (Figure 8)

3. Water Quality Monitoring Program in the Raymond Basin

   Water in the Basin continues to be of good quality regarding most constituents except for a few sources with high fluoride concentrations in the foothills and high nitrate concentrations in the Monk Hill Subarea and Pasadena Subarea. Volatile organic compound (VOC) contaminants have been detected in several

areas, particularly in the Arroyo Seco.

In late June of 1997, perchlorate, a previously unknown contaminant, was detected in several basin wells and several monitoring wells at the JPL Superfund site. As a result of the recent change in the maximum contaminant level (MCL) for, Hexavalent Chromium, RBMB staff continues to monitor these and other constituents to manage water quality effectively and efficiently in the Basin.

4. Nonparty Pumpers

The Las Encinas Hospital resumed pumping from its private well during the 2017-18 fiscal year and produced 1.33 acre-feet.

5. JPL Superfund Clean-Up Project

Progress has been made over the past few years with respect to groundwater cleanup efforts by the National Aeronautics and Space Administration (NASA) Jet Propulsion Laboratory (JPL). NASA funded and completed the installation of a 2,000 gpm ion exchange treatment plant at Lincoln Avenue Water Company in July 2004. It is within the area known as OU-1 under a clean-up order issued by the USEPA for the removal of Perchlorate. The intent is to contain high levels of VOC's and Perchlorate that are known to be migrating from beneath the JPL property.

Additionally, NASA owns and operates a Bio-remediation treatment plant located on the JPL site intended to intercept high-level contaminants at the source. A new extraction (EW-3) and injection well (IW-3) were added to the OU-1 system and began operation in October 2007. This plant extracted, treated and re-injected 396.71 acre-feet of groundwater from July 1, 2016 through June 30, 2017 (detailed production and injection data contained in Appendix G). In 2015, NASA began the process to drill a new well, Lincoln Avenue Well No. 6, to provide a greater leading-edge capture. During fiscal year 2016-17, the well drilling was completed, and pump development occurred. The well was placed into service in 2017-18 and production is properly accounted for.

In fiscal year 2018-19, NASA drilled a new well on the JPL site for additional contaminant plume capture. It is not constructed to increase extraction rates, rather a replacement for an existing well upstream.

6. Cost Account for Water Salvaged by Sierra Madre (Table 12)

Expenditures during 2017-18 totaled $885.

7. Over Extractions (Table 3)

There was one Producer that over extracted during fiscal year 2018-19. The City of Sierra Madre is part of an imported water program that delivers treated water from the Metropolitan Water District for spreading and groundwater recharge. During this fiscal year, the City extracted more water than was delivered by approximately 250 acre feet. The City has agreed to deliver the overage amount during fiscal year 2019-20 to balance the Basin.

8. Meters Tested (Table 13)

The Management Board requires annual testing of well water production meters. Meters recording more than 5% slow require adjustment to production records. Meters recording fast are the responsibility of the party to adjust. 40 production meters were tested in fiscal year 2018-19 under the program and all were in compliance.

9. Long Term Storage Accounts, (Table 4A, 4B and 4C)

The Management Board affirmed the previously approved 1.0 percent loss factor and $1.50 administrative charge per acre foot for fiscal year 2018-19. A net decrease of approximately 1,616 acre-feet in Long Term Storage occurred between July 1, 2018 and June 30, 2019. Beginning June 30, 2009 Long Term Storage Accounts in the Pasadena Subarea will not be allowed to increase in size beyond certified 2007-2008 amounts.

Effective April 15, 2015, the Board approved Short-Term Storage accounts for the Pasadena Subarea that allows a “one year carry-over” of unused water for the purpose of storing water in wetter years.

TABLE 1. SUMMARY OF WATER CONDITIONS AND OPERATIONS

Item	2017-18 Fiscal Year	2018-19 Fiscal Year	Change From Previous Fiscal Year
Number of:			
Parties	16	16	0%
Active pumpers	15	15	0%
Active non-parties	2	2	0%
Watermaster Expenses	$394,630.00	$595,753.00	51%
Valley Rainfall (inches)	9.87	29.53	199%
Spreading Operation (acre feet)*	1,867	8,844	374%
"Decreed Right" (acre feet)	30,622	30,622	0%
Water Use (acre feet):			
Extractions	24,963	24,638	-1%
Surface Water Diversions	286	609	113%
Imported Water	30,991	30,614	-1%
Exported Water	(1,410)	(926)	-34%
Net Water Use	**54,829**	**54,934**	**0%**

* Spreading numbers include 1,015.35 of imported MWD water spread by the City of Sierra Madre

TABLE 2. DECREED RIGHTS AND AMOUNTS OF WATER EXTRACTED AND EXCHANGED

Party Name	Allowable Extractions								Amount Extracted[3/]	Balance (6-7)	Storage			Carryover into 2019-20	Loss of Decreed Rights
	Decreed Right	Sub-area Reductions	Net Decreed Right (1a + 1b)	Carryover from 2017-18	Net Leases[1/]	Prior Year Spread Credit[2/]	Imported Water Spread/ Injection	Sub-Total +(1 thru 5)			Long-Term Storage FY Activity [4/]	Short-Term Storage FY Activity[5/]	Cooperative Storage Program[6/]		
	1a	1b	1	2	3	4	5	6	7	8	9	10	11	12	13
Monk Hill Subarea															
La Canada Irrigation District	100.0	-	100.0	10.0	0.0	0.0	0.0	110.0	0.6	109.4	99.4	N/A	N/A	10.0	0.0
Las Flores Water Company	249.0	-	249.0	0.0	0.0	41.3	0.0	290.3	247.2	43.1	18.2	N/A	N/A	24.9	0.0
Lincoln Avenue Water Company	567.0	-	567.0	0.0	1,000.0	82.5	0.0	1,649.5	1,684.3	(34.8)	(34.8)	N/A	N/A	0.0	0.0
Pasadena, City of	4,464.0	-	4464.0	446.4	(1816.0)	491.2	(527.3)	3,058.3	2,611.9	446.4	0.0	N/A	0.0	446.4	0.0
Pasadena Cemetery Association	91.0	-	91.0	0.0	0.0	0.0	0.0	91.0	59.9	31.1	22.0	N/A	N/A	9.1	0.0
Rubio Canon Land & Water Assn.	1,221.0	-	1221.0	11.8	800.0	25.9	0.0	2,058.7	1,711.4	347.3	225.2	N/A	N/A	122.1	0.0
Valley Water Company	797.0	-	797.0	0.0	16.0	0.0	104.8	917.8	1,129.6	(211.8)	(211.8)	N/A	N/A	0.0	0.0
Subtotal	**7,489.0**		**7,489.0**	**468.2**	**0.0**	**640.9**	**(422.5)**	**8,175.6**	**7,444.9**	**730.7**	**118.2**			**612.5**	**0.0**
Pasadena Subarea	*30% Reduction [7/]*														
Alhambra, City of	1,031.0	(309.3)	721.7	103.1	(207.0)	0.0	0.0	617.8	0.0	617.8	0.0	N/A	N/A	103.1	514.7
Arcadia, City of	2,118.0	(635.4)	1,482.6	211.8	0.0	0.0	0.0	1,694.4	509.0	1,185.4	0.0	N/A	N/A	211.8	973.6
California-American Water Company	2,299.0	(689.7)	1,609.3	212.8	0.0	0.0	0.0	1,822.1	2,047.3	(225.2)	(225.2)	0.0	N/A	0.0	0.0
East Pasadena Water Company	515.0	(154.5)	360.5	51.5	0.0	0.0	0.0	412.0	1.8	410.2	0.0	(51.5)	N/A	51.5	410.2
H.E. Huntington Library & Art Gallery	372.0	(111.6)	260.4	37.2	0.0	0.0	0.0	297.6	289.4	8.2	(200.0)	171.0	N/A	37.2	0.0
Kinneloa Irrigation District	516.0	(154.8)	361.2	51.6	207.0	65.4	0.0	685.2	650.1	35.1	0.0	(16.5)	N/A	51.6	0.0
Pasadena, City of	8,343.0	(2,502.9)	5,840.1	0.0	0.0	200.7	369.1	6,409.9	7,352.2	(942.3)	(942.3)	N/A	N/A	0.0	0.0
San Gabriel County Water District	1,091.0	(327.3)	763.7	86.4	0.0	0.0	0.0	850.1	847.4	2.7	0.0	N/A	N/A	2.7	0.0
Sunny Slope Water Company	1,558.0	(467.4)	1,090.6	0.0	0.0	0.0	0.0	1,090.6	965.4	125.2	0.0	N/A	N/A	125.2	0.0
Subtotal	**17,843.0**	**(5,352.9)**	**12,490.1**	**754.4**	**0.0**	**266.1**	**369.1**	**13,879.7**	**12,662.6**	**1,217.1**	**(1,367.5)**	**103.0**		**583.1**	**1,898.5**
Western Unit Total	**25,332.0**	**(5,352.9)**	**19,979.1**	**1,222.6**	**0.0**	**907.0**	**(53.4)**	**22,055.3**	**20,107.5**	**1,947.8**	**(1,249.3)**	**103.0**	**0.0**	**1,195.6**	**1,898.5**
Recapitulation for City of Pasadena															
Santa Anita Subarea	*500' Limitation [8/]*														
Arcadia, City of	3,526.0	(1,205.0)	2,321.0	0.0	0.0	0.0	0.0	2,321.0	2,319.0	2.0	N/A	N/A	N/A	0.0	2.0
Sierra Madre, City of [9/]	1,764.0	(824.0)	940.0	0.0	0.0	0.0	1,015.4	1,955.4	2,211.0	(255.7)	N/A	N/A	N/A	0.0	0.0
Subtotal	**5,290.0**	**(2,029.0)**	**3,261.0**	**0.0**	**0.0**	**0.0**	**1,015.4**	**4,276.4**	**4,530.1**	**(253.7)**				**0.0**	**2.0**
RAYMOND BASIN TOTAL	**30,622.0**	**(7,381.9)**	**23,240.1**	**1,222.6**	**0.0**	**907.0**	**962.0**	**26,331.7**	**24,637.6**	**1,694.1**	**(1,249.3)**	**103.0**	**0.0**	**1,195.6**	**1,900.5**

1/ See Table 10
2/ See Appendix C
3/ See Appendix D
4/ See Tables 4A and 4B for detailed FY activity.
5/ See Table 4C for detailed FY activity. Short-Term Storage approved by RBMB 4/15/15
6/ Applies to City of Pasadena
7/ 30% Reduction adopted by RBMB January 2008.
8/ 500' Limitation per Section VI of 1944 Raymond Basin Judgement.
9/ Salvage Credit shown on Table 9
N/A = Not Applicable

TABLE 3. OVEREXTRACTIONS IN 2018-19

(acre feet)

Party	Decreed Right 1955 (1)	Allowable Carryover from 2017-18 (2)	Net Leases and Prior Year Spreading Credit (3)	Imported Water Spread/ Injection (4)	Long Term Storage Program (5)	Allowable Extractions (1+2+3+4+5) (6)	Amount Extracted (7)	Overextraction[1/]		
								Amount Overextracted (6-7) (8)	Amount Allowable (10% of Decreed Right 1955) (9)	Percent Overextracted (8/1) (10)
Monk Hill Subarea										
None										
Pasadena Subarea										
None										
Santa Anita Subarea										
City of Sierra Madre[2/]	940.0	0.0	0.0	1015.4	0.0	1955.4	2211.0	(255.6)	94.0	27%

[1/] Based on modification of Judgment dated March 26, 1984

[2/] 500' Limitation per Section VI of 1944 Raymond Basin Judgement. City of Sierra Madre to deliver deficit during FY 2019-20.

TABLE 4 A. LONG TERM STORAGE ACCOUNTS - MONK HILL SUBAREA

(acre feet)

Party Name	Storage @ 6/30/18	FY Activity	1% Loss	Storage @ 6/30/19	Maximum Storage	Exchanges	Adjusted Maximum Storage	Percentage of Storage Used
Monk Hill Subarea								
La Canada ID	999.3	99.4	10.0	1,088.7	2,300.0	0.0	2,300.0	47.3%
Las Flores WC	457.2	18.2	4.6	470.8	900.0	0.0	900.0	52.3%
Lincoln Avenue WC	1,254.8	(34.8)	12.2	1,207.8	2,200.0	0.0	2,200.0	54.9%
Pasadena Cemetery	184.3	22.0	1.8	204.5	300.0	0.0	300.0	68.2%
Pasadena, City	13,398.8 1/	0.0	110.4	13,288.4	13,400.0	0.0	13,400.0	99.2%
Rubio Canon LW	1,077.0	225.2	10.8	1,291.4	3,700.0	0.0	3,700.0	34.9%
Valley WC	525.4	(211.8)	3.1	310.5	3,400.0	0.0	3,400.0	9.1%
Monk Hill Total	***17,896.8***	***118.2***	***152.9***	***17,862.1***	***26,200.0***	***0.0***	**26,200.0**	***68.2%***

1/ Pasadena, City - CSP water included in Long Term Storage Totals

Subarea	CSP @ 6/30/18	1% Loss	CSP @ 6/30/19
Monk Hill	2,358.7	(23.6)	**2,335.1**

TABLE 4 B. LONG TERM STORAGE ACCOUNTS - PASADENA SUBAREA

(acre feet)

Party Name	Capped Storage @ 6/30/18	FY Activity	1% Loss	Storage @ 6/30/19	Capped Storage @ 6/30/19	Percentage of Storage Used
Pasadena Subarea						
Alhambra, City	3,543.1	0.0	35.4	3,507.7	3,507.7	99.0%
Arcadia, City	891.0	0.0	8.9	882.1	882.1	99.0%
Cal American WC	1,510.6	(225.2)	12.9	1,272.5	1,272.5	84.2%
E. Pasadena WC	317.4	0.0	3.2	314.2	314.2	99.0%
Huntington Library	434.1	(200.0)	2.3	231.8	231.8	53.4%
Kinneloa ID	790.0	0.0	7.9	782.1	782.1	99.0%
Pasadena, City [1/]	9,968.8	(942.3)	90.3	8,936.2	8,936.2	89.6%
San Gabriel CWD	2,825.0	0.0	28.3	2,796.7	2,796.7	99.0%
Sunny Slope WC	2,427.9	0.0	24.3	2,403.6	2,403.6	99.0%
Pasadena Total	***22,707.9***	***(1,367.5)***	***213.5***	***21,126.9***	***21,126.9***	***100.0%***

1/ Pasadena, City - CSP water excluded in Long Term Storage Totals

Subarea	CSP @ 6/30/18	Less CSP Drawdown	1% Loss	CSP @ 6/30/19
Pasadena	12,043.3	-	(120.4)	**11,922.9**

TABLE 4C. SHORT TERM STORAGE ACCOUNTS - PASADENA SUBAREA

(acre feet)

Party Name	STS Account	STS Brought Forward @ 6/30/18[1]	Used @ 6/30/19	Added @ 6/30/19	Storage @ 6/30/19[2]
Pasadena Subarea					
Alhambra, City	N	-	-	-	-
Arcadia, City	N	-	-	-	-
Cal American WC	Y	0.00	0.00	0.00	0.00
E. Pasadena WC	Y	300.0	300.0	248.5	248.5
Huntington LAG	Y	52.4	52.4	223.4	223.4
Kinneloa ID	Y	144.9	144.9	128.4	128.4
Pasadena, City	N/A	-	-	-	-
San Gabriel CWD	N	-	-	-	-
Sunny Slope	N	-	-	-	-
Pasadena Subarea Total		***497.3***	***497.3***	***600.3***	***600.3***

1/ Short Term Storage Accounts approved by RBMB on 4/15/15

2/ Max Short Term Storage Capped @ 300 AF per Agency. Max is a combination of 10% carryover and Short Term Storage

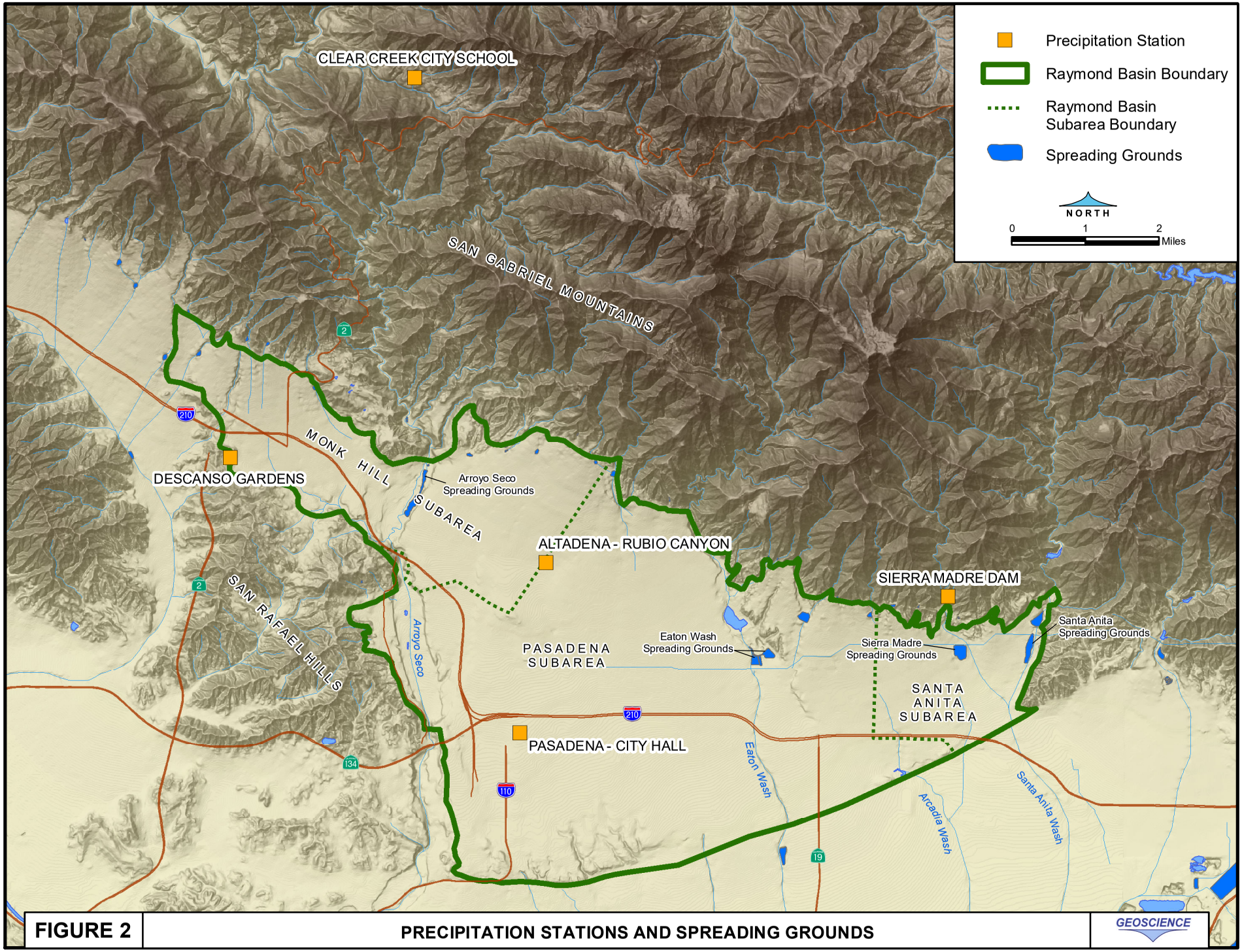


FIGURE 2 | **PRECIPITATION STATIONS AND SPREADING GROUNDS** | GEOSCIENCE

TABLE 5. PRECIPITATION

(inches)

Station [1/]	Station Location	Period of Record (years)	Precipitation		
			2017-18	2018-19	70-year Average [2/]
Altadena-Rubio Canyon (Station 176)	Monk Hill/Pasadena	98	10.27	29.76	20.89
Descanso Gardens (Station 1071B)	Monk Hill	70	8.82	26.29	21.34
Pasadena City Hall (Station 610B)	Pasadena	95	8.03	26.51	19.41
Sierra Madre Dam (Station 144) [3/]	Santa Anita	91	12.36	35.54	24.27
Average			9.87	29.53	21.48

[1/] Obtained from LACDPW. Station locations shown on Figure 2.

[2/] 1949-50 to 2018-19

[3/] Data was not available from Station 144 during April 2019 through June 2019. Station 63C (Santa Anita Dam) was used for April 2019 through June 2019.

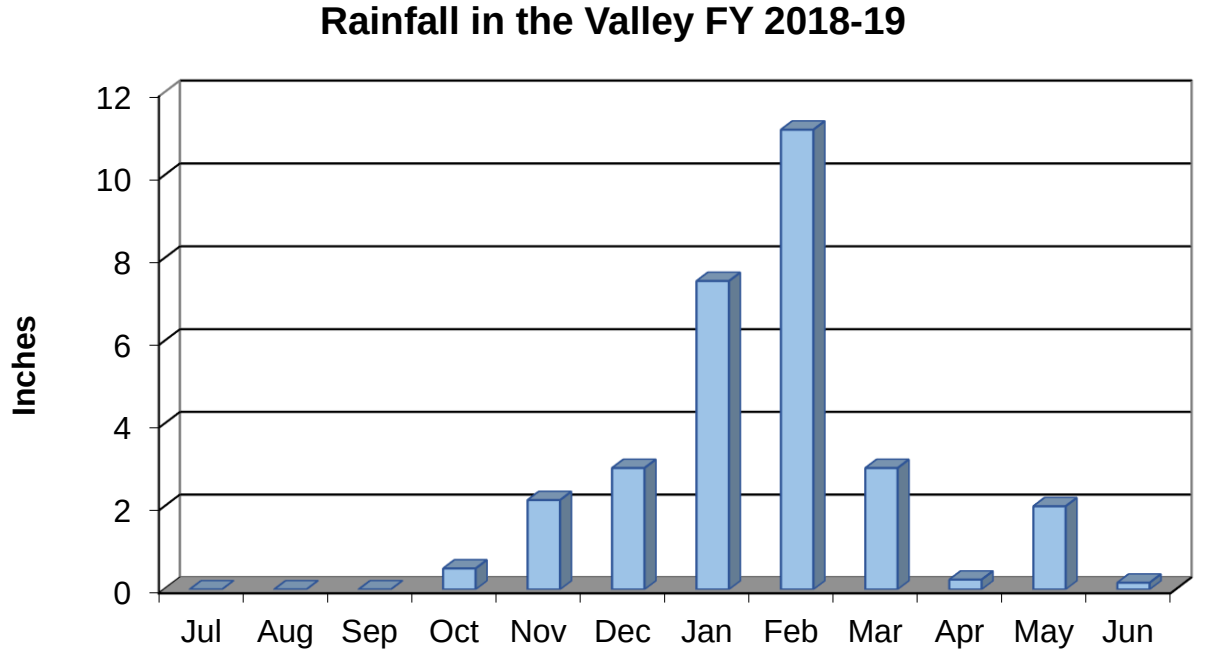


FIGURE 3A - AVERAGE RAINFALL [4/]

[4/] Average of Stations 176, 1071B, 610B, and 144.

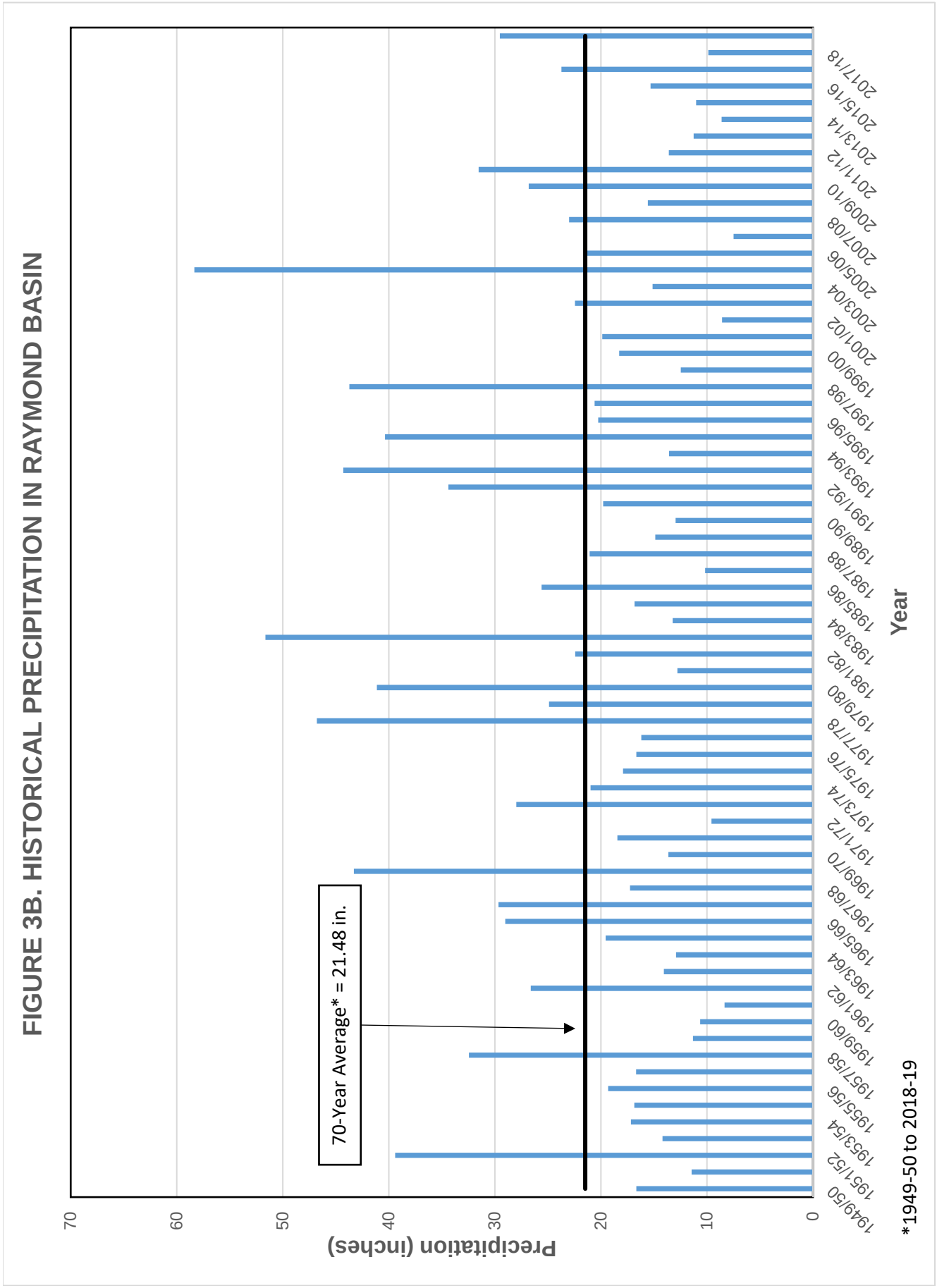


FIGURE 3B. HISTORICAL PRECIPITATION IN RAYMOND BASIN
70-Year Average* = 21.48 in.
Precipitation (inches)
Year
*1949-50 to 2018-19

TABLE 6. WATER USE IN 2018-19

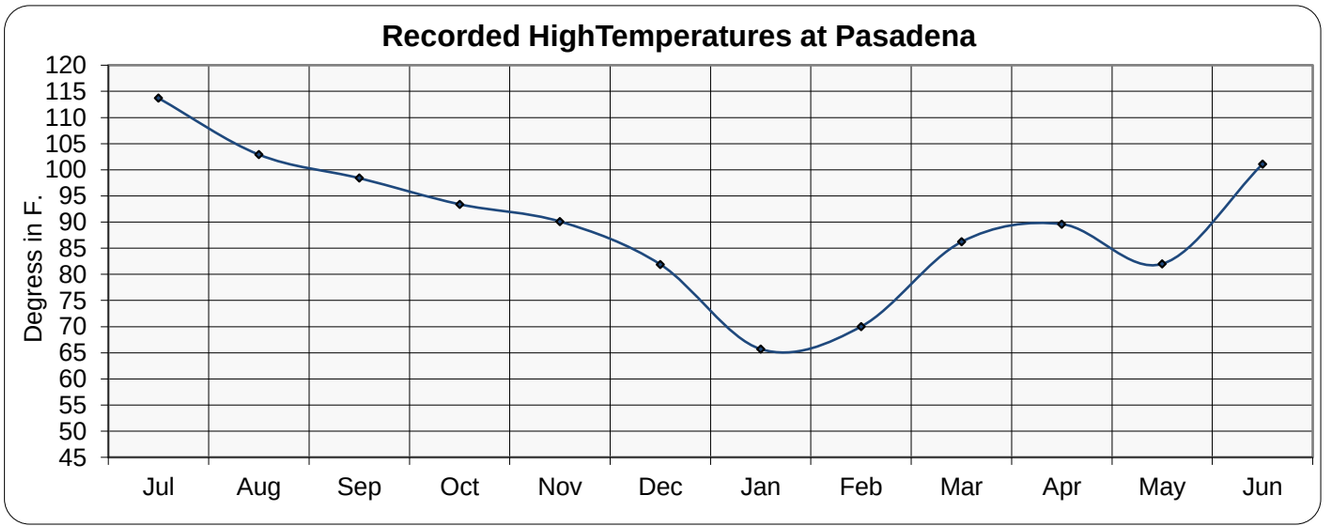
(acre feet)

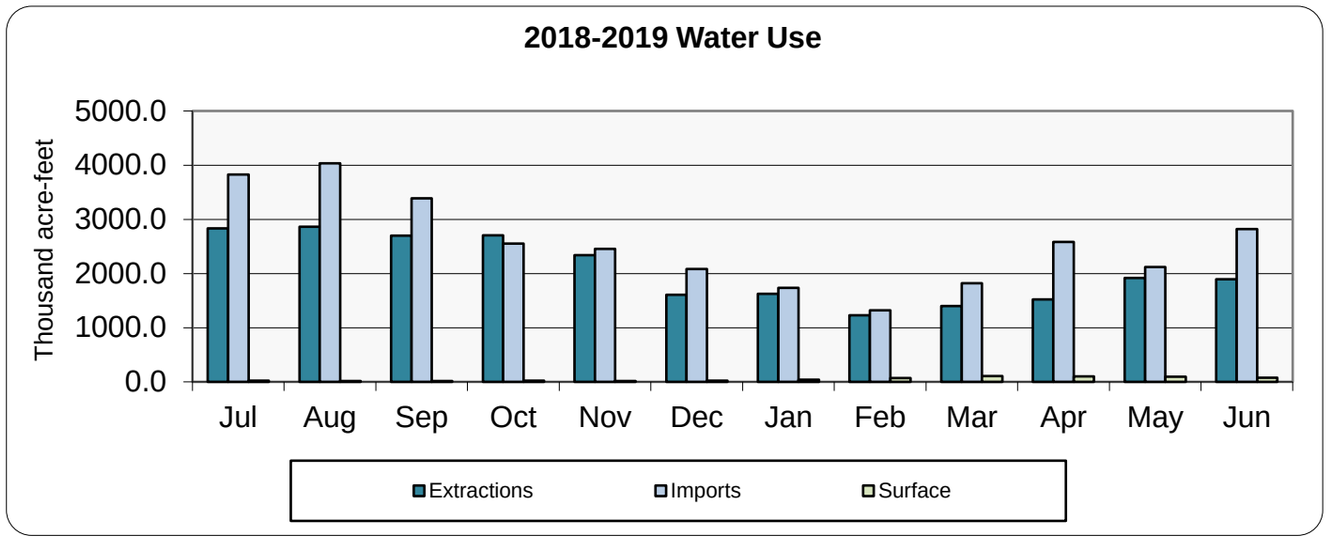
Party	Ground Water Extractions (1)	Water Diversions To System[1/] (2)	Imported MWD/Other Water (3)	Water Exported From Basin (4)	Water Imported (Exported) Within Basin (5)	Total Water Use Within Basin (1+2+3+4+5)
Alhambra, City of	0.0	-	2,942.1	-	-	2,942.1
Arcadia, City of	2,828.1	-	0.0	-	-	2,828.1
California-American Water Company	2,047.3	-	852.5	-	-	2,899.8
East Pasadena Water Company	1.8	-	559.5 [2/]	(18.2)	-	543.0
H.E. Huntington Library & Art Gallery	289.4	-	-	-	-	289.4
Kinneloa Irrigation District	650.1	142.2	-	-	-	792.2
La Canada Irrigation District	0.6	55.1	2,277.0	-	-	2,332.7
Las Flores Water Company	247.2	0.0	422.4	-	-	669.6
Lincoln Avenue Water Company	1,684.3	229.2	150.5 [2/]	-	-	2,064.0
Pasadena Cemetery Association	59.9	-	-	-	-	59.9
Pasadena, City of	9,964.1	-	17,995.9	(0.1)	128.8	28,088.7
Rubio Canon Land & Water Association	1,711.4	173.3	0.0	-	-	1,884.7
San Gabriel County Water District	847.4	-	0.0	-	-	847.4
Sierra Madre, City of	2,211.0	8.9	1,015.4	-	-	3,235.3
Sunny Slope Water Company	965.4	-	2,437.0 [2/]	(907.6)	-	2,494.7
Valley Water Company	1,129.6	-	1,961.4	-	-	3,091.0
Total	***24,637.6***	***608.6***	***30,613.5***	***(926.0)***	***128.8***	***55,062.5***

[1/] Does not include surface water diversions for spreading credit.

[2/] San Gabriel Basin water.

FIGURE 4 - CLIMATIC CONDITIONS AND WATER USE





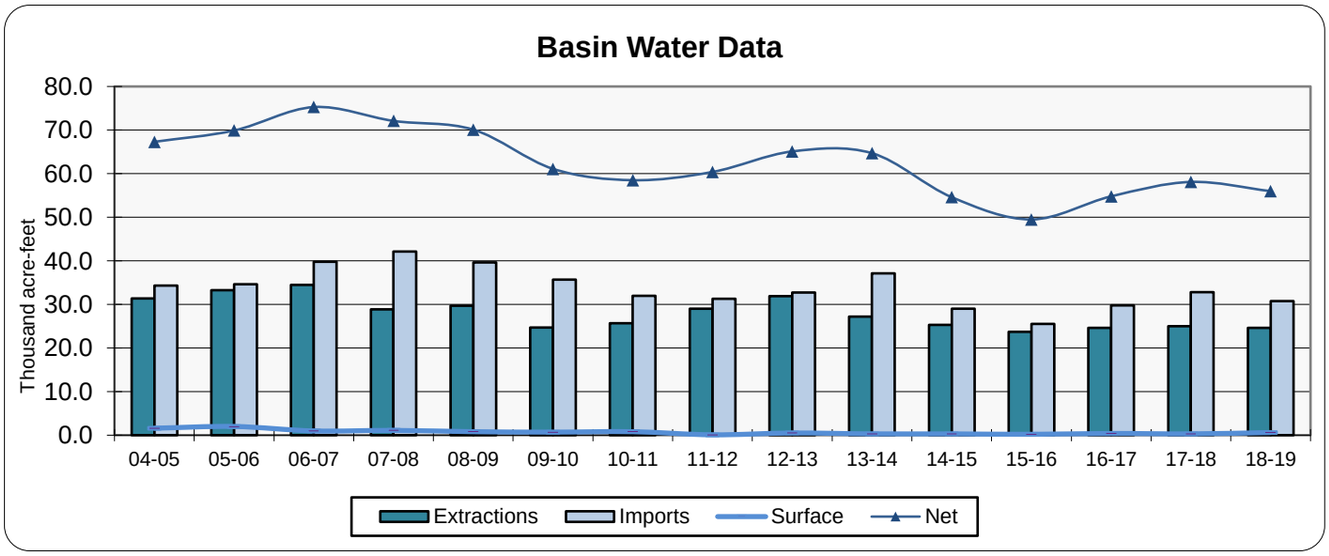


TABLE 7.

COMPARISON OF LONG-TERM AVERAGE ANNUAL EXTRACTIONS TO SAFE YIELD

(acre feet)

Year July 1 through June 30	Annual Extractions [1/]							
	Western Unit			Eastern Unit				Raymond Basin Area (3+4)
	Monk Hill Subarea	Pasadena Subarea	Subtotal (1+2)	Gross Pumped	Salvage Credit Pumped	Difference	Subtotal	
	(1)	(2)	(3)				(4)	(5)
1950-51	7,098	13,418	20,516	2,861	-	2,861	2,861	23,377
51-52	5,903	10,750	16,653	2,489	-	2,489	2,489	19,142
52-53	5,973	12,471	18,444	4,870	335	4,535	4,535	22,979
53-54	6,283	11,765	18,048	3,378	596	2,782	2,782	20,830
54-55	6,420	12,783	19,203	4,528	559	3,969	3,969	23,172
Average Annual Extractions	6,335	12,237	18,573	3,625			3,327	21,900
Safe Yield 1938 [2/]	6,039	11,621	17,660	3,791			3,791	21,451
Average Over/(Under) Extractions[3/]	296	616	913	(166)			(464)	449
1955-60	35,444	82,043	117,487	23,484	436	23,048	23,048	140,535
1960-65	37,356	89,193	126,549	20,483	2,952	17,532	17,532	144,081
1965-70	37,557	90,821	128,378	23,745	433	23,312	23,312	151,690
1970-75	41,206	87,783	128,990	28,539	1,310	27,228	27,228	156,218
1975-80	40,871	97,733	138,604	28,836	4,434	24,403	24,403	163,007
1980-85	45,697	96,417	142,114	31,553	6,076	25,478	25,478	167,592
1985-90	31,058	101,822	132,880	33,170	6,057	27,113	27,113	159,994
1990-95	37,155	72,509	109,663	31,732	4,752	26,980	26,980	136,643
95-2000	54,452	108,960	163,412	33,482	7,500	25,982	25,982	189,394
2000-05	29,375	97,030	126,405	29,516	4,223	25,293	25,293	151,698
2005-10	25,775	93,895	119,670	31,525	7,638	23,888	23,888	143,557
2010-11	4,338	15,623	19,961	5,733	425	5,308	5,308	25,269
2011-12	9,006	14,086	23,092	5,934	644	5,290	5,290	28,382
2012-13	10,783	16,498	27,281	4,674	1,751	2,923	2,923	30,205
2013-14	10,024	14,598	24,622	2,315	0	2,315	2,315	26,937
2014-15	7,820	15,363	23,183	2,127	0	2,127	2,127	25,309
2015-16	6,595	14,247	20,842	2,910	0	2,910	2,910	23,752
2016-17	6,488	13,423	19,911	4,637	0	4,637	4,637	24,548
2017-18	6,917	14,028	20,945	4,017	0	4,017	4,017	24,963
2018-19	7,445	12,663	20,108	4,530	0	4,530	4,530	24,638
Average Annual Extractions	7,632	18,240	25,872	5,614	810	4,804	4,804	30,676
Safe Yield [4/]	7,489	17,843	25,332	5,290			5,290	30,622
Average Over/(Under) Extractions[3/]	143	397	540	324			(486)	54

1/ Includes spreading water pumped in Western Unit and excludes salvage credit water pumped by City of Sierra Madre.
2/ Non-party pumping not included during the period 1944-45 through 1954-55
3/ Extractions greater than safe yield; positive; extractions less than safe yield: (negative).
4/ Effective 1955-56 through present and excludes non-party pumping.

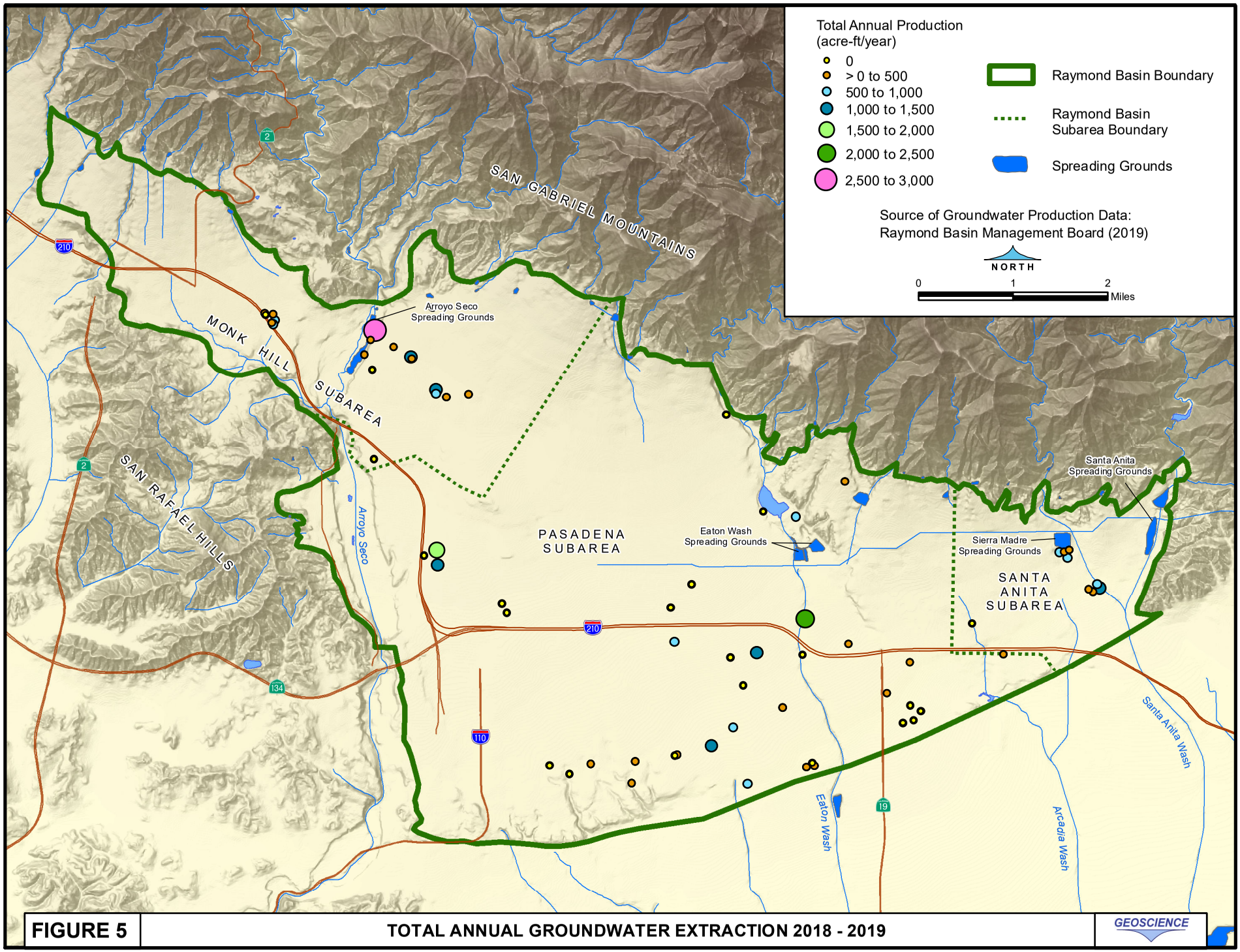


FIGURE 5 | **TOTAL ANNUAL GROUNDWATER EXTRACTION 2018 - 2019** | GEOSCIENCE

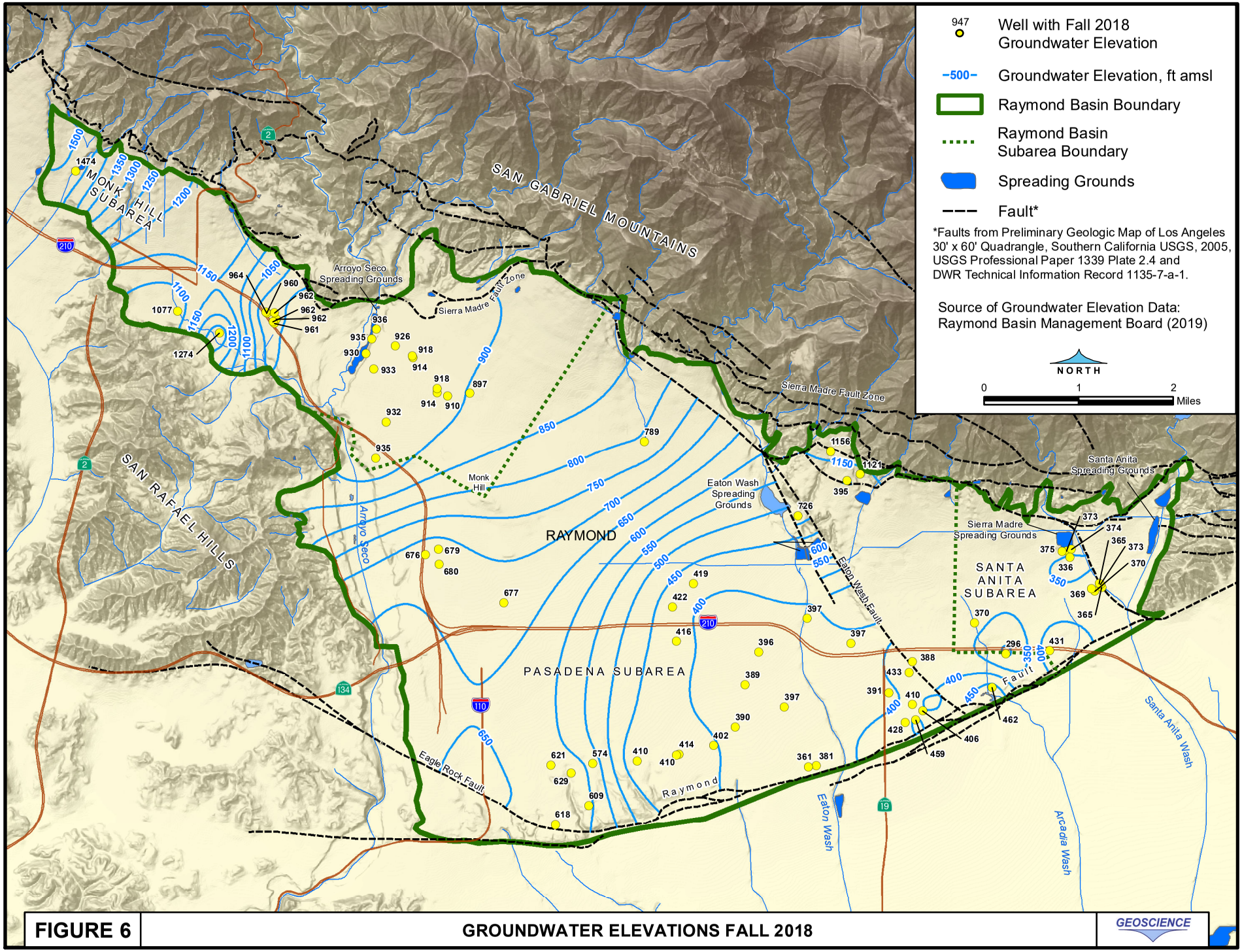


FIGURE 6 | **GROUNDWATER ELEVATIONS FALL 2018** | GEOSCIENCE

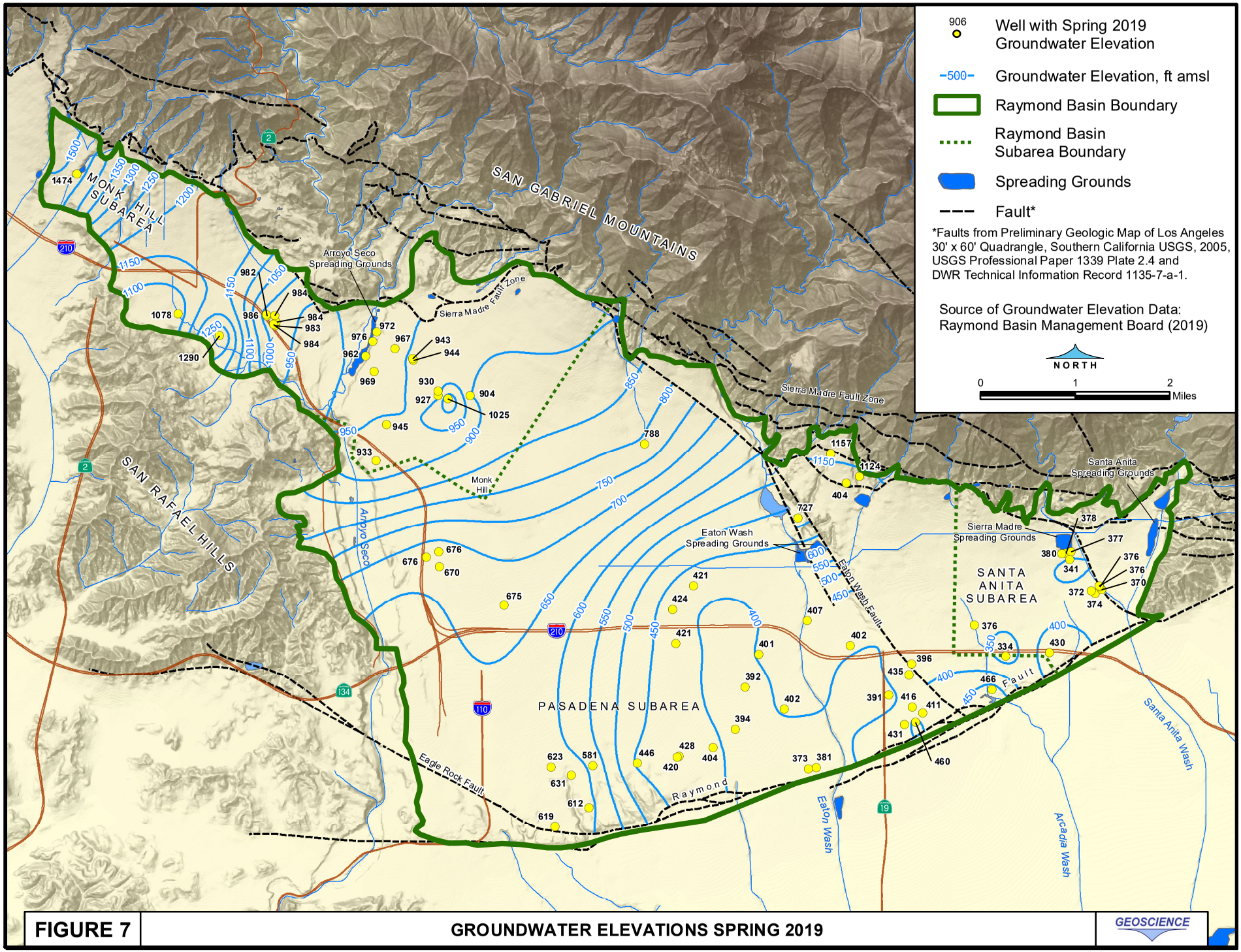


FIGURE 7 | **GROUNDWATER ELEVATIONS SPRING 2019** | GEOSCIENCE

TABLE 8. GROUNDWATER LEVEL ELEVATIONS AT REPRESENTATIVE WELLS

(feet)

Subarea	***Owner*** Key Well Name *(Surface Elevation in feet)*	Groundwater Level Elevations (feet above sea level)			
		October 2017	April 2018	October 2018	April 2019
Monk Hill					
	City of Pasadena Sheldon *(1,048.9)*	947	942	935	933
Pasadena					
West Central	***City of Pasadena*** Copelin 3 *(916.4)*	680	687	676	676
Northeast	***Kinneloa Irrigation District*** Wilcox *(874.9)*	396	396	398	401
East Central	***Cal-American Water Company*** Winston *(682.6)*	395	393	390	394
South Central	***City of Alhambra*** No. 2 *(701.9)*	629	628	628	631
Southeast	***East Pasadena Water Company*** Well No. 7 *(601.2)*	413	414	411	416
Santa Anita					
	City of Arcadia Orange Grove No. 1A *(604.4)*	381	392	364	371

nm: no measurement

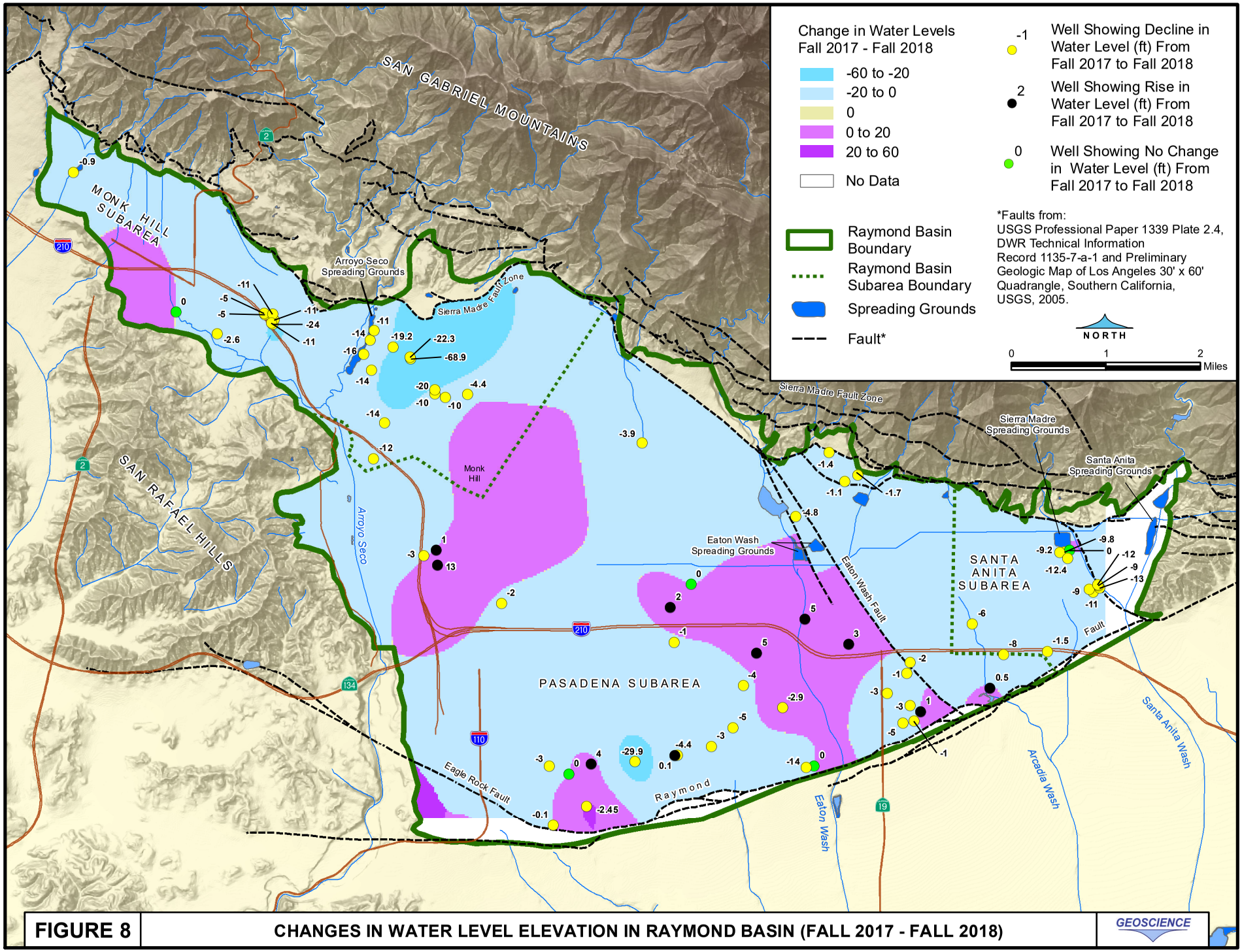


FIGURE 8 CHANGES IN WATER LEVEL ELEVATION IN RAYMOND BASIN (FALL 2017 - FALL 2018)

GEOSCIENCE

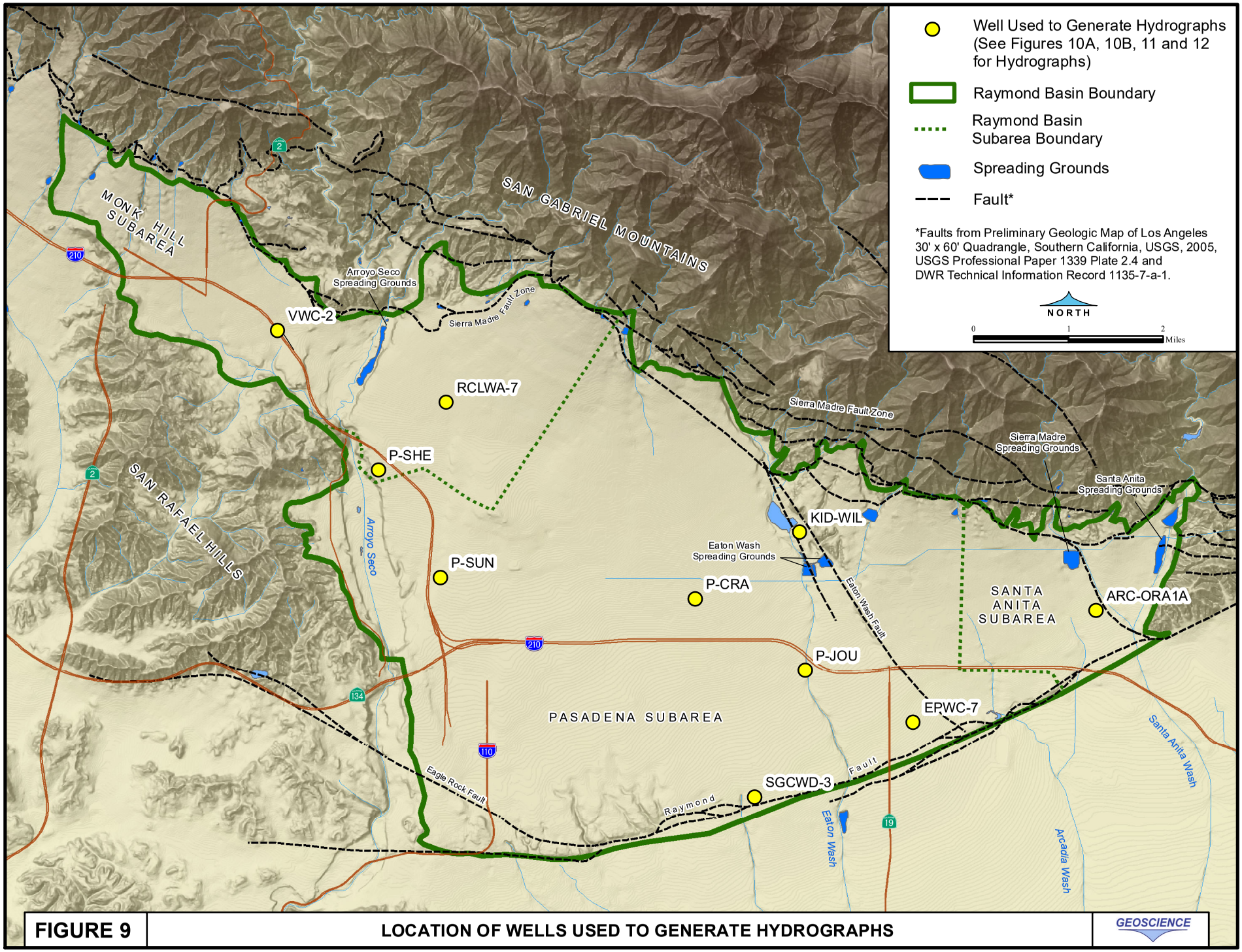
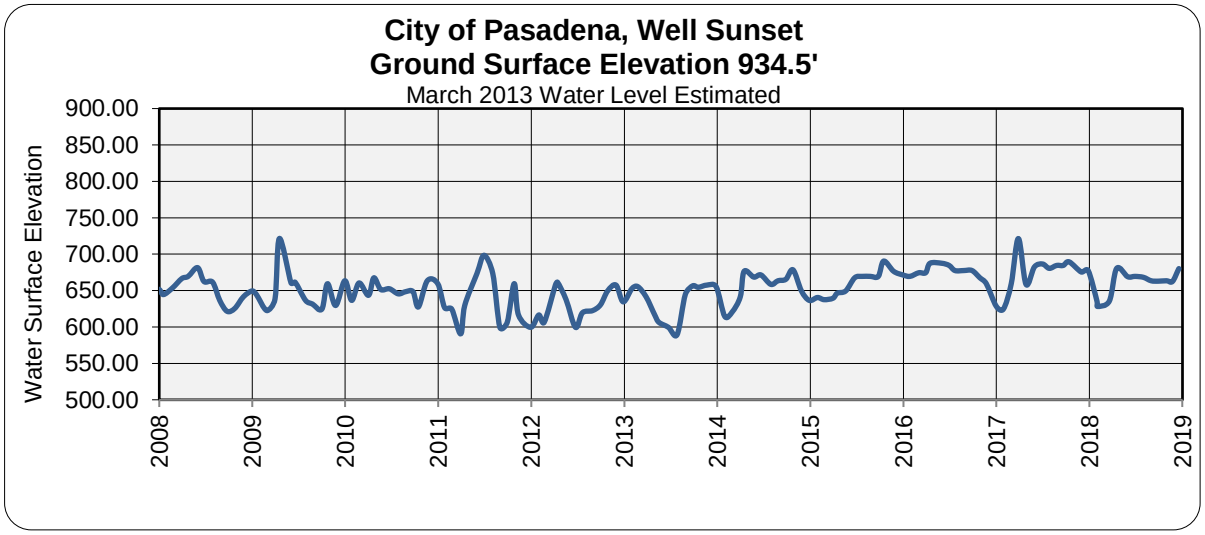
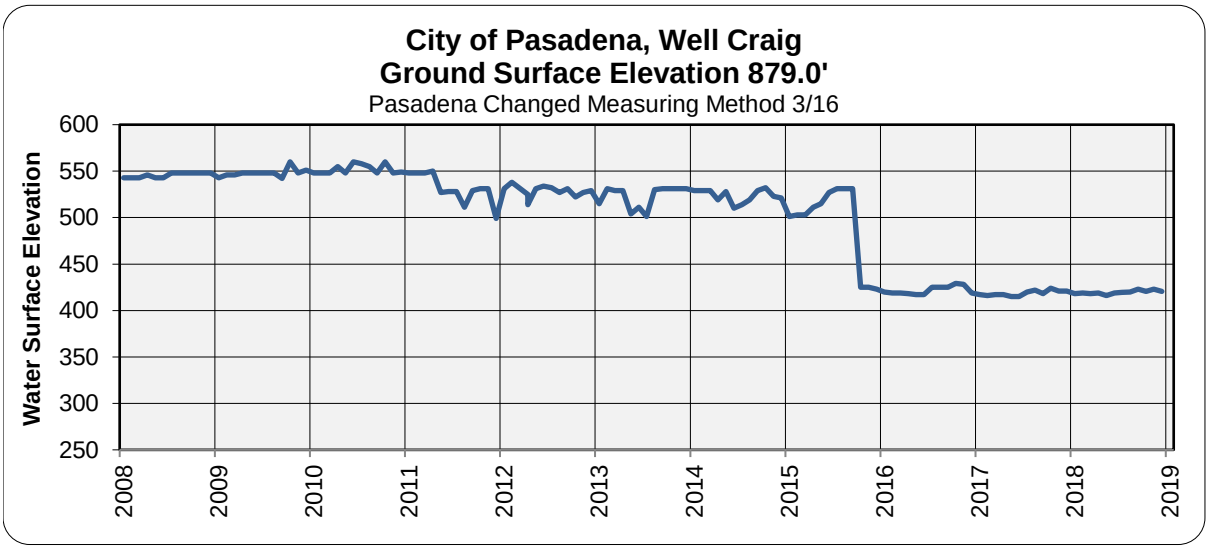


FIGURE 9 | **LOCATION OF WELLS USED TO GENERATE HYDROGRAPHS** | GEOSCIENCE

FIGURE 10a - FLUCTUATION OF WATER LEVELS AT WELLS IN THE PASADENA SUBAREA





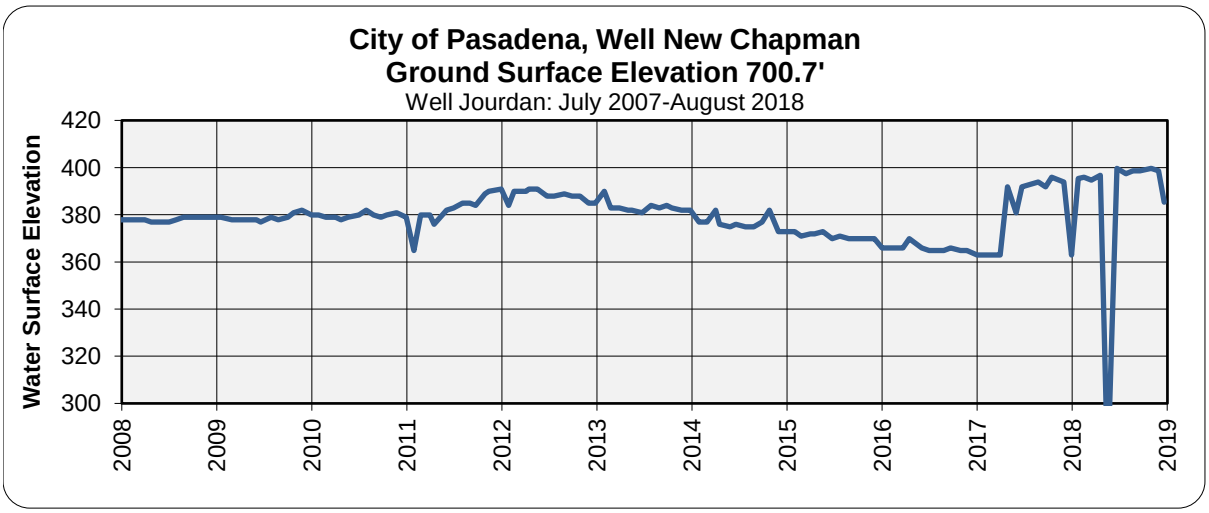
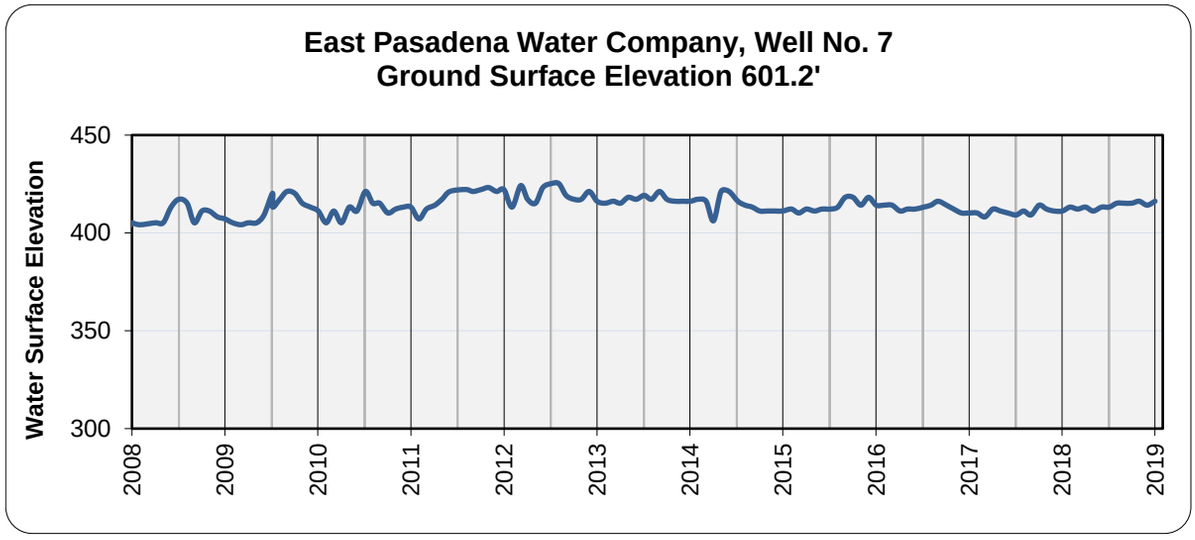
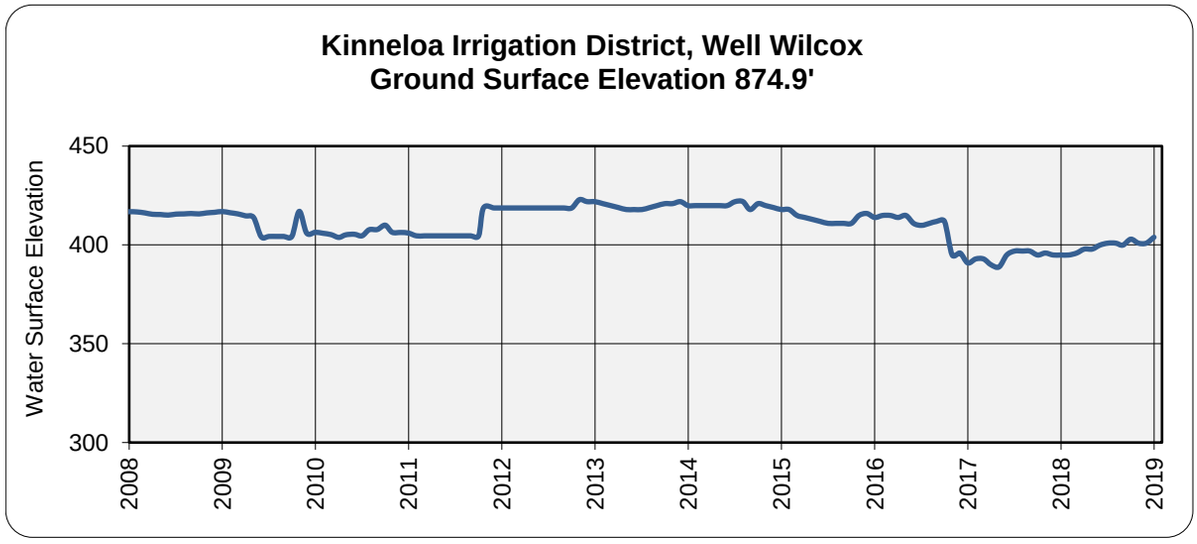


FIGURE 10b - FLUCTUATION OF WATER LEVELS AT WELLS IN THE PASADENA SUBAREA





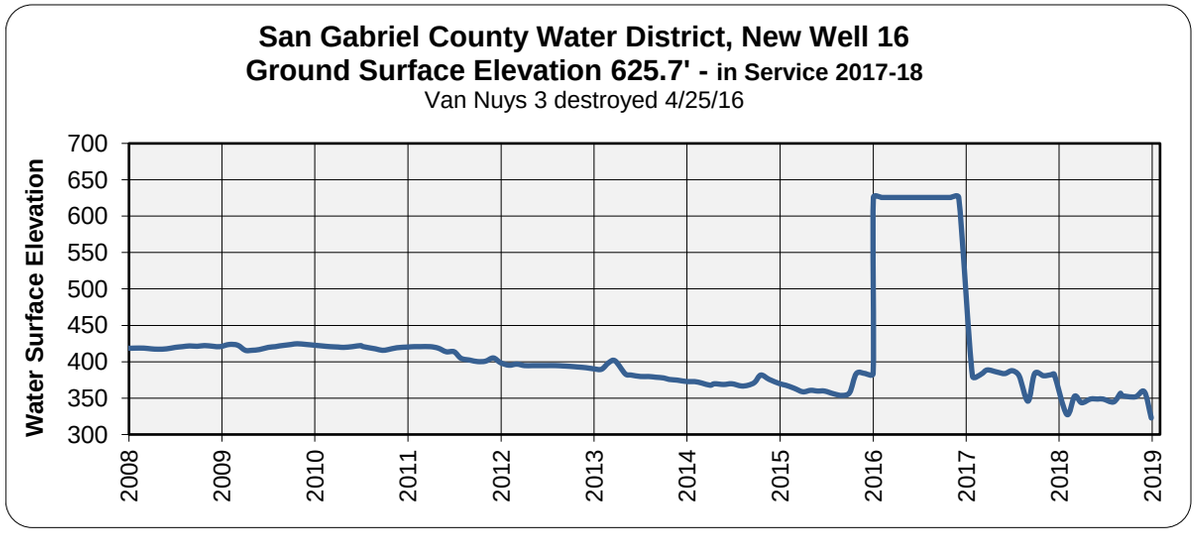


FIGURE 11 - FLUCTUATION OF WATER LEVELS AT WELLS IN THE SANTA ANITA SUBAREA

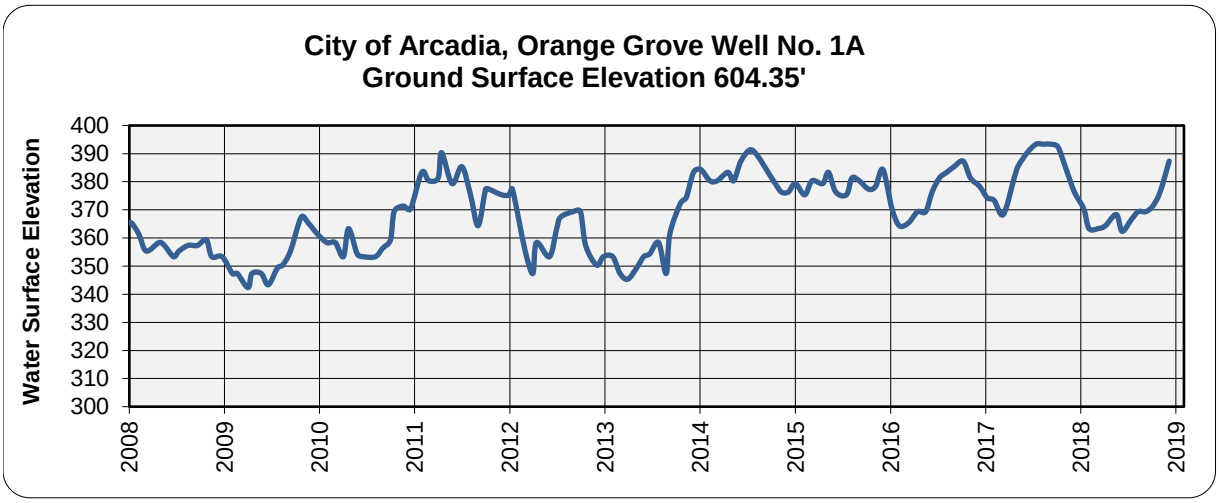


FIGURE 12 - FLUCTUATION OF WATER LEVELS AT WELLS IN THE MONK HILL SUBAREA

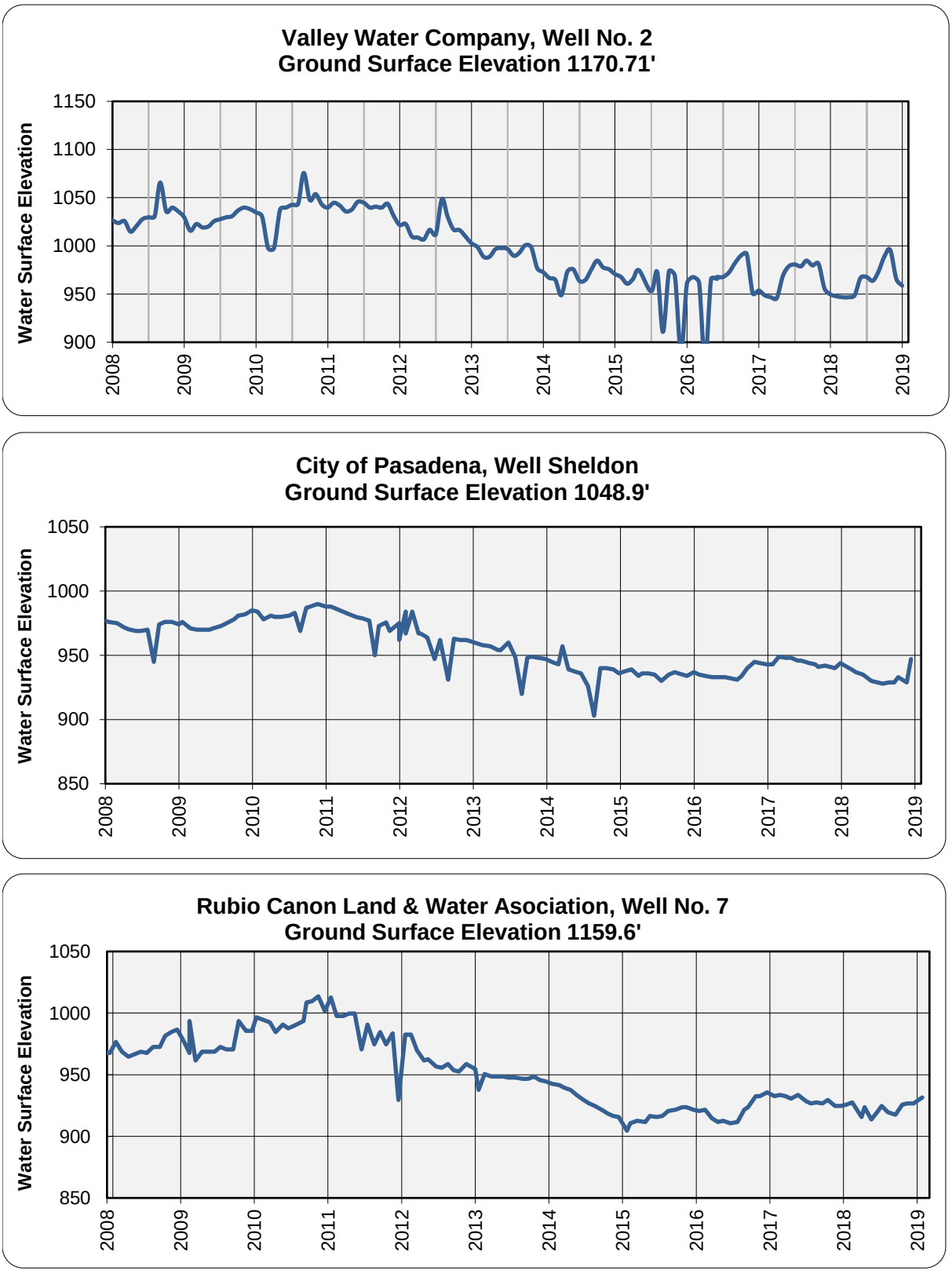


TABLE 9. CREDIT FOR WATER SPREAD CITY OF SIERRA MADRE

(acre feet)

Season	(1) Salvage Water at Beginning of Year	Water Spread for Salvage			(5) Salvage Water Lost to Subsurface Outflow	(6) Salvage Water Extracted	(7) Salvage Water at End of Year
		(2) Amount	(3) Lost Through Natural Percolation	(4) Water Stored (2)-(3)			(1)+(4)-(5)-(6)
1952-53	836.3	258.0	94.6	163.4	243.1	334.9	421.7
53-54	421.7	580.0	4.6	575.4	115.4	596.1	285.6
54-55	285.6	341.0	21.5	319.5	15.1	559.1	30.9
55-56	30.9	429.0	90.9	338.1	9.6	128.0	231.4
56-57	231.4	331.0	167.1	163.9	42.1	62.0	291.2
57-58	291.2	3,409.0	811.9	2,597.1	278.8	0.0	2,609.5
58-59	2,609.5	1,308.0	521.0	787.0	945.1	37.5	2,413.9
59-60	2,413.9	45.0	10.4	34.6	705.6	208.2	1,534.7
1960-61	1,534.7	51.0	16.0	35.0	214.1	1,116.3	239.3
61-62	239.3	1,283.0	445.6	837.4	43.1	292.8	740.8
62-63	740.8	1,121.0	544.4	576.6	241.7	253.9	821.8
63-64	821.8	699.0	164.4	534.6	180.2	451.3	724.9
64-65	724.9	904.0	208.6	695.4	142.8	837.3	440.2
65-66	440.2	4,233.0	979.0	3,254.0	533.5	433.1	2,727.6
66-67	2,727.6	4,537.0	945.1	3,591.9	1,110.9	0.0	5,208.6
67-68	5,208.6	2,625.0	1,069.2	1,555.8	1,663.1	0.0	5,101.3
68-69	5,101.3	2,984.0	371.1	2,612.9	1,532.3	0.0	6,181.9
69-70	6,181.1	1,529.3	932.2	597.1	1,495.5	0.0	5,282.7
1970-71	5,282.7	1,145.3	369.7	775.6	1,285.7	0.0	4,772.6
71-72	4,772.6	1,014.4	311.5	702.9	1,518.3	0.0	3,957.2
72-73	3,957.2	3,204.0	824.5	2,379.5	815.1	84.7	5,436.9
73-74	5,436.9	3,029.1	891.9	2,137.2	1,603.7	64.7	5,905.7
74-75	5,905.7	2,244.0	927.8	1,316.2	1,744.1	1,161.0	4,316.8
75-76	4,316.8	1,029.8	387.3	642.5	1,299.5	784.0	2,875.8
76-77	2,875.8	1,106.6	427.4	679.2	863.9	124.6	2,566.5
77-78	2,566.5	3,974.7	463.8	3,510.9	937.3	1,033.1	4,107.0
78-79	4,107.0	4,473.0	1,475.7	2,997.3	1,541.7	894.7	4,667.9
79-80	4,667.9	3,636.3	717.7	2,918.6	971.8	1,597.2	5,017.5
1980-81	5,017.5	2,271.8	1,055.2	1,216.6	1,288.9	2,068.1	2,877.1
81-82	2,877.1	2,004.5	764.4	1,240.1	968.0	197.9	2,951.3
82-83	2,951.3	3,509.4	690.0	2,819.4	1,206.2	0.0	4,564.5
83-84	4,564.5	2,970.8	1,297.9	1,672.9	1,338.7	1,912.2	2,986.5
84-85	2,986.5	1,519.1	503.7	1,015.4	723.7	1,897.7	1,380.5
85-86	1,380.5	3,402.6	974.0	2,428.6	293.6	2,385.8	1,129.7
86-87	1,129.7	969.3	335.2	634.1	258.3	1,505.5	0.0
87-88	0.0	1,756.2	566.9	1,189.3	28.8	772.4	388.1
88-89	388.1	1,458.2	610.4	847.8	103.8	930.2	201.9
89-90	201.9	574.3	279.6	294.7	34.0	462.6	0.0

continued on following page

TABLE 9. CREDIT FOR WATER SPREAD CITY OF SIERRA MADRE

(acre feet)

Season	(1) Salvage Water at Beginning of Year	Water Spread for Salvage			(5) Salvage Water Lost to Subsurface Outflow	(6) Salvage Water Extracted	(7) Salvage Water at End of Year
		(2) Amount	(3) Lost Through Natural Percolation	(4) Water Stored (2)-(3)			(1)+(4)-(5)-(6)
1990-91	0.0	1,542.1	575.0	967.1	0.0	755.4	211.7
91-92	211.7	3,100.7	680.1	2,420.6	0.0	247.6	2,384.7
92-93	2,384.7	3,150.6	487.9	2,662.7	473.0	129.3	4,445.1
93-94	4,445.1	2,113.2	747.2	1,366.0	1,262.7	1,919.1	2,629.3
94-95	2,629.3	4,221.4	706.6	3,514.8	532.2	1,700.3	3,911.6
95-96	3,911.6	3,697.8	1,252.2	2,445.6	1,482.8	505.0	4,369.4
96-97	4,369.4	2,371.7	735.9	1,635.8	1,010.1	2,489.2	2,505.9
97-98	2,505.9	3,424.0	435.1	2,988.9	214.3	984.3	4,296.2
98-99	4,296.2	2,874.9	922.5	1,952.4	590.5	2,038.1	3,620.0
99-00	3,620.0	1,195.0	304.7	890.3	740.6	1,483.1	2,286.6
2000-01	2,286.6	1,513.5	424.0	1,089.5	440.5	1,041.5	1,894.1
01-02	1,894.1	294.8	14.7	280.1	0.0	1,205.3	968.9
02-03	968.9	1,444.7	500.3	944.4	0.0	231.3	1,682.0
03-04 [1/]	1,682.0	751.7	124.1	627.6	0.0	1,465.6	844.0
04-05	844.0	5,612.7	1,070.2	4,542.5	282.2	279.1	4,825.2
05-06	4,825.2	2,932.7	603.1	2,329.6	385.7	1,637.8	5,131.3
06-07	5,131.3	745.5	211.0	534.4	0.0	2,653.8	3,011.9
07-08	3,011.9	1,761.1	260.6	1,500.5	0.0	1,395.9	3,116.5
08-09	3,116.5	1,585.2	217.7	1,367.5	0.0	1,189.6	3,294.5
09-10	3,294.5	2,535.1	696.4	1,838.7	0.0	760.4	4,372.8
2010-11	4,372.8	3,086.9	771.4	2,315.5	0.0	424.6	6,263.7
11-12	6,263.7	1,276.7	637.2	639.5	0.0	644.1	6,259.1
12-13	6,259.1	326.8	125.6	201.2	0.0	1,751.4	4,708.9
13-14	4,708.9	456.6	197.5	259.2	0.0	0.0	4,968.1
14-15	4,968.1	391.9	144.0	247.9	0.0	0.0	5,216.0
15-16	5,216.0	677.4	263.5	413.9	0.0	0.0	5,629.9
16-17	5,629.9	1,630.1	676.2	953.9	0.0	0.0	6,583.8
17-18	6,583.8	641.3	275.2	366.1	0.0	0.0	6,949.9
18-19	6,949.9	1,996.7	437.0	1,559.7	0.0	0.0	8,509.6

1/ Adjustment to 2003-04 End of Year Salvage

TABLE 10. TRANSFERS OR LEASES OF DECREED RIGHT

(acre-feet)

Lease No.	Lease Date	Leasor	Leasee	Acre-Feet
PASA-LAWC-19-01	1/10/2019	Pasadena City Of	Lincoln Avenue Water Company	1,000.0
PASA-RCLW-19-01	1/10/2019	Pasadena City Of	Rubio Canon Land Water Assoc	800.0
PASA-VWC-19-01	3/12/2019	Pasadena City Of	Valley Water Company	16.0
ALH-KID-19-01	5/20/2019	Alhambra City Of	Kinneloa Irrigation District	207.0

LONG TERM STORAGE SPACE EXCHANGES

(acre-feet)

Lease No.	Leasor	Leasee	Lease Period	Acre-Feet
Pasadena Subarea				
Monk Hill Subarea				

TABLE 11. APPORTIONMENT OF BUDGET AMONG PARTIES
FISCAL YEAR ENDING JUNE 30, 2019

Party	Part A			Part B			Part C	
	Acre Feet Decreed Right 1955 (1)	DWR Services Apportionment % (2)	DWR Services Apportionment $ (3)	Acre Feet Diversions 2016-17 (4)	Spreading Program Apportionment % (5)	Spreading Program Apportionment $ (6)	Other Administration $ (7)	Total Cost (3)+(6)+(7) (8)
Alhambra, City of	1,031	3.4%	**$ 170**				**$ 20,551**	**$ 20,721**
Arcadia, City of	5,644	18.4%	**$ 920**				**$ 111,217**	**$ 112,137**
California-American Water Co.	2,299	7.5%	**$ 375**				**$ 45,333**	**$ 45,708**
East Pasadena Water Co.	515	1.7%	**$ 85**				**$ 10,275**	**$ 10,360**
The Huntington Library and Art Gallery	372	1.2%	**$ 60**				**$ 7,253**	**$ 7,313**
Kinneloa Irrigation District	516	1.7%	**$ 85**	129.8	7.0%	**$ 210**	**$ 10,275**	**$ 10,570**
La Canada Irrigation District	100	0.3%	**$ 15**				**$ 1,814**	**$ 1,829**
Las Flores Water Company	249	0.8%	**$ 40**	79.5	4.3%	**$ 129**	**$ 4,836**	**$ 5,005**
Lincoln Avenue Water Company	567	1.8%	**$ 90**	228.4	12.3%	**$ 369**	**$ 10,880**	**$ 11,339**
Pasadena Cemetery Association	91	0.3%	**$ 15**				**$ 1,814**	**$ 1,829**
Pasadena, City of	12,807	41.8%	**$ 2,090**	1,391.0	75.0%	**$ 2,250**	**$ 252,656**	**$ 256,996**
Rubio Canon L&W Assoc.	1,221	4.0%	**$ 200**	25.0	1.4%	**$ 42**	**$ 24,177**	**$ 24,419**
San Gabriel County Water Dist.	1,091	3.6%	**$ 180**				**$ 21,760**	**$ 21,940**
Sierra Madre, City of	1,764	5.8%	**$ 290**				**$ 35,057**	**$ 35,347**
Sunny Slope Water Company	1,558	5.1%	**$ 255**				**$ 30,827**	**$ 31,082**
Valley Water Company	797	2.6%	**$ 130**				**$ 15,715**	**$ 15,845**
	30,622	100.0%	**$ 5,000**	1,853.7	100.0%	**$ 3,000**	**$ 604,440**	**$ 612,440**

TABLE 12. STATEMENT OF 2018-19 INCOME AND EXPENDITURES

	Budget	Actual	Variance
Cash--July 1, 2018	**$ 2,378,805**	**$ 3,131,917**	**$ 753,112**
Revenue			
Assessments:			
DWR Service Assess - Part A	5,000	5,000	-
Spreading Program - Part B	3,000	3,000	-
Administrative Assess - Part C	604,440	604,440	-
Long-Term Storage Program	400	136	(264)
Title 22 Program	35,000	38,104	3,104
Salvage Credit Reimbursement	3,000	885	(2,115)
Discharge Credit Calc. Reimb.	3,000	-	(3,000)
FWC - Project Income	1,000	71	(929)
Interest and Other Income	25,000	81,669	56,669
Total Revenue	**$ 679,840**	**$ 733,305**	**$ 53,465**
Expense:			
DWR Administration	$ 5,000	$ 4,312	$ 688
MSGBW Administration	246,852	246,852	-
Office Expense	6,000	857	5,143
Professional Services	5,000	-	5,000
General Engineering	40,000	20,944	19,056
Staff Reports for Wells	10,000	3,394	6,606
FWC - Basin Contribution	1,000	71	929
Monk Hill Study	10,000	-	10,000
Federal Grant Match	175,000	-	175,000
Monitoring Well Design	10,000	172	9,828
Monitoring Well Construction	200,000	192,516	7,484
Salt & Nutrient Mgmt Plan	2,000	-	2,000
GW Level Management Prgm	1,500	-	1,500
S.A. Subarea Engineering	150,000	40,184	109,816
Pasadena Subarea Study	10,000	20,266	(10,266)
Groundwater M&M Plan	5,000	-	5,000
Legal Fees	10,000	70	9,930
Legislative Advocacy	40,000	36,000	4,000
Meeting & Travel	6,000	4,997	1,003
Strategic Planning	5,000	-	5,000
Mapping/GIS/Data Management	5,000	-	5,000
Annual Report Expense	7,000	9,649	(2,649)
Audit Expense	5,000	3,400	1,600
Membership Dues	7,500	6,402	1,098
Title 22 Program Expense	40,000	41,738	(1,738)
Spreading Program	3,000	2,033	967
Sierra Madre Salvage Credit Expense	3,000	885	2,115
Discharge Credit Calc. Expense	3,000	-	3,000
FWC - Project Expense	1,000	71	929
Contingency	10,000	-	10,000
Total Expense	**$ 1,022,852**	**$ 634,813**	**$ 388,039**
Cash -- June 30, 2019	**$ 2,035,793**	**$ 3,230,409**	**$ 1,194,616**

TABLE 13. METER TESTING PROGRAM FOR 2018-19

PARTY	OWNER DESIGNATION	TEST DATE	METER ERROR[1/]		NOTES
Alhambra, City of	WELL NO. 2	-	-	-	Inactive
Arcadia, City of	ANOAKIA		-	-	Inactive
	CHAPMAN 6 A		-	-	Inactive
	CHAPMAN 6 B		-	-	Inactive
	CHAPMAN 7		-	-	Inactive
	COLORADO	3/11/2019	0.5%	Slow	
	HUGO REID		-	-	Inactive
	ORANGE GROVE 1A	3/11/2019	0.9%	Fast	
	ORANGE GROVE 2A	3/11/2019	1.6%	Slow	
	ORANGE GROVE 5A	3/11/2019	1.0%	Fast	
	ORANGE GROVE 6	3/11/2019	0.7%	Slow	
	RANCHO 6	-	-	-	Inactive
California-American Water Company	LAMANDA PARK	-	-	-	Inactive
	LOMBARDY	5/1/2019	1.2%	Slow	
	OAK KNOLL	-	-	-	Inactive
	OSWEGO	-	-	-	Inactive
	PATTON	5/1/2019	0.9%	Slow	
	WINSTON	5/1/2019	1.7%	Slow	
East Pasadena Water Company	WELL NO. 1	-	-	-	Inactive
	WELL NO. 7	-	-	-	Inactive
	WELL NO. 8	6/20/2019	0.2%	Slow	
H.E. Huntington Library & Art Gallery	CANYON	-	-	-	Inactive
	ORLANDO	-	-	-	Inactive
	ROSCOE MOSS	5/3/2019	0.4%	Slow	
	BUDDY MOSS	5/3/2019	0.6%	Slow	
Kinneloa Irrigation District	K-3	4/16/2019	0.4%	Fast	
	WAGNER		-	-	Inactive
	WILCOX	4/16/2019	0.0%		
La Canada Irrigation District	WELL NO. 1 (2/)	-	-	-	Inactive
	WELL NO. 6 (2/)	-	-	-	Inactive
Las Flores Water Company	WELL NO. 2	4/2/2019	1.3%	Slow	
Lincoln Avenue Water Company	WELL NO. 3	2/20/2019	0.1%	Fast	
	WELL NO. 5	2/22/2019	0.0%		
	WELL NO. 6	2/22/2019	0.5%	Slow	
Pasadena	ARROYO	5/8/2019	1.6%	Fast	
	BANGHAM	5/9/2019	0.1%	Slow	
	COPELIN 3	-	-	-	Inactive
	CRAIG	-	-	-	Inactive
	EATON 51	-	-	-	Inactive
	GARFIELD	-	-	-	Inactive
	GROUNDS-INJECT.	-	-	-	Inactive

1/ Slow=Percent production meter is under recording
Fast=Percent production meter is over recording
2/ Waiver of meter test requirement granted due to inactivity related to water quality issues

TABLE 13. METER TESTING PROGRAM FOR 2018-19

PARTY	OWNER DESIGNATION	TEST DATE	METER ERROR[1/]		NOTES
Pasadena, City of (cont)	JOURDAN	-	-	-	Inactive
	MONTE VISTA	-	-	-	Inactive
	NEW CHAPMAN	5/10/2019	0.7%	Fast	
	PASA 52	5/8/2019	0.5%	Slow	
	SHELDON 1	-	-	-	Inactive
	SUNSET	5/9/2019	0.2%	Slow	
	VENTURA	5/8/2019	0.3%	Slow	
	VILLA	-	-	-	Inactive
	WELL 58	5/10/2019	1.5%	Slow	
	WELL 59	5/9/2019	1.0%	Slow	
	WINDSOR	-	-	-	Inactive
	WOODBURY	12/18/2018	2.1%	Fast	
Pasadena Cemetery Association	WELL NO. 2-3	6/14/2019	3.4%	Fast	
	WELL NO. 4	-	-	-	Inactive
Rubio Canon Land and Water Assoc.	WELL NO. 4	5/28/2019	1.7%	Fast	
	WELL NO. 7	5/28/2019	2.3%	Slow	
San Gabriel County Water District	VAN NUYS 3			-	Well Destroyed 4/25/16
	WELL NO. 16	5/3/2019	0.3%	Fast	
Sierra Madre, City of	WELL NO. 3	6/5/2019	0.0%		
	WELL NO. 4	6/10/2019	2.3%	Fast	
	WELL NO. 5	6/5/2019	1.1%	Slow	
	WELL NO. 6	6/5/2019	0.9%	Slow	
Sunny Slope Water Company	WELL NO. 1	-	-	-	Inactive
	WELL NO. 6	-	-	-	Inactive
	WELL NO. 11	11/13/2018	2.2%	Slow	
	WELL NO. 12	11/13/2018	1.1%	Fast	
Valley Water Company	WELL NO. 1	1/7/2019	2.3%	Fast	
	WELL NO. 2	1/9/2019	3.4%	Fast	
	WELL NO. 3	1/9/2019	1.1%	Slow	
	WELL NO. 4	1/7/2019	0.5%	Fast	

1/ Slow=Percent production meter is under recording
Fast=Percent production meter is over recording

APPENDIX A
SIGNIFICANT ACTIONS BY RAYMOND BASIN MANAGEMENT BOARD
2018-19

July 18, 2018

Authorized the Executive Officer to execute agreement with the Main San Gabriel Basin Watermaster for administrative services for fiscal year 2018-19.

The Board adopted Resolution No. 53-0718 of recognizing Mr. Bob Hayward for his years of service to the RBMB.

October 17, 2018

Adoption of the 2017-18 Financial Audits.

Accepted and approved the Annual Report of Watermaster Service in the Raymond Basin for fiscal year 2017-18.

January 16, 2019

The RBMB approved the Annual Review of Investment Policy.

The Board received and filed the Annual Summary of the City of Sierra Madre Replenishment Program for the Santa Anita Subarea for fiscal year 2017-18.

Received and filed Well Destruction Reports for Rubio Canon Land and Water Association Wells 2 & 6.

April 17, 2019

Adopted fiscal budget and apportionment of annual assessments among the parties for fiscal 2019-20 along with the corresponding assessments for such year.

Approved consultant selection to prepare the 2018-19 Financial Audit.

The Board approved Pasadena Subarea Alternative Management Scenario No. 1.

Determination that the Long Term Storage administration fee should remain at $1.50 per acre foot for fiscal 2019-20 and a Long Term Storage loss factor of 1.0% remain in place for fiscal 2019-20.

Authorized the Executive Officer to work with Bucknam & Associates, Geoscience, and Stetson Engineers, within the amounts budgeted for fiscal year 2019-20.

APPENDIX B
CHRONOLOGY OF THE RAYMOND BASIN

1880 Southern California land development boom begins.

1881 First wells drilled in Raymond Basin to supply water for irrigated agriculture and expanding municipalities.

1908 U.S. Geological Survey report on Raymond Basin published, showing 141 wells in operation.

1913 Overdraft of Raymond Basin begins.

1914 City of Pasadena Water Department initiates a program to replenish the basin by conserving and spreading storm runoff on gravel beds at the foot of the San Gabriel Mountains. Pasadena continued the spreading program until 1924, by which time it had replenished the basin by more than 20,000 AF, using water that otherwise would have made its way to the Los Angeles River.

1924 Pasadena terminates its spreading program partly because of the sharp decline in available runoff due to another dry cycle that began in 1922. Through the remainder of the 1920s, underground water levels dropped, some wells failed and longer pumping lifts raised operating costs in the others. The drop in water levels was not just seasonal; they no longer recovered in the spring.

Raymond Basin users continued to pump groundwater without fully understanding the effects of their actions on each other and on the basin. A full description of the basin's geology and underground water storage characteristics did not appear until 1934.

1928 In the meantime, Pasadena focused on acquiring a supplemental water supply. Consequently, Metropolitan Water District of Southern California was established to build and operate a Colorado River aqueduct, although this water would not be available for at least a decade.

California Division of Water Resources granted Pasadena permits to store and divert flood flows of the San Gabriel River and divert up to 4,000 AF of water per year.

1929 Pasadena voters approved a $10 million bond issue to finance the construction of Morris Dam on the San Gabriel River and a conduit to the city.

1932 San Gabriel Valley Protective Association sued to prevent Pasadena from

building the dam and diverting the water. MWD helped resolve the dispute by agreeing to purchase Morris Dam from Pasadena once Colorado River water became available.

1934 California Division of Water Resources published Bulletin 45, giving a full description of the basin's geology and storage characteristics. It was not until the early 1940s that users learned the basin had been in overdraft every year since 1913, and that the annual overdraft had averaged 7,000 acre feet, or roughly 33% of the average annual safe yield.

1935 Pasadena officials called together representatives of other known Raymond Basin producers, reviewed the published reports of DWR and attempted to negotiate a pumping reduction on a cooperative rather than an adversarial basis. These efforts failed and city officials contemplated legal action.

Pasadena officials had reached the limits of their willingness to act alone. The city reduced pumping somewhat when it began to receive additional supplies from the San Gabriel River. But in order to redress the overdraft on its own, Pasadena would have to cut its production by one-half and import the expensive Colorado River water when available, while other basin users continued to meet all their needs with groundwater. Pasadena was unwilling to do so.

1937 Pasadena chose instead to defend its right as a senior Raymond Basin appropriator. On September 23, 1937, Pasadena initiated proceedings in Superior Court against Alhambra and other major Raymond Basin water users. The action sought to adjudicate and quiet title to Pasadena's rights in the basin, and to enjoin the annual overdraft. The trial court required Pasadena to amend its complaint to name as defendants all entities in the basin pumping more than 100 acre feet annually. There were 30 defendants in all. The judge also ruled that the suit was not a simple action to quiet title but was a general adjudication of water rights in the basin.

City of Pasadena v City of Alhambra et al., was the first basinwide adjudication of groundwater rights in California and the first to use the Court Reference Procedure under the California Water Code. That procedure authorized the referral of cases involving the determination of water rights to the Division of Water Resources by the state Department of Public Works for investigation of the physical facts.

1939 20 parties were involved in the court reference procedure and petitioned the court to refer the factual issues to DWR for investigation. The judge directed the referee to determine the “safe yield” of the basin and ascertain whether there was a surplus or an overdraft.

The investigation was expensive and time-consuming. Nevertheless, the referee's investigation avoided multiple concurrent investigations by several parties and provided the parties and court with a coherent, single view of the Raymond Basin and its problems.

1943 Referee's report filed in Raymond Basin litigation; this draft report described the basic geology of the Raymond Basin and specified the location of the Monk Hill Basin, and the Pasadena and Santa Anita subareas. The draft report stated the safe yield for Raymond Basin as a whole was 21,900 acre feet per year and recommended limiting withdrawals to the safe yield and using imported water to meet further demands.

As the referee's draft report circulated among the parties, most tried to work out a settlement. Litigation had changed the default condition of the negotiations. Before litigation, failure to negotiate a settlement simply continued the status quo--the pumping race. With litigation underway, if the parties failed to achieve a negotiated settlement, the case would go to trial and the court would decide the parties' water rights. Since Raymond Basin was the first groundwater basin to be adjudicated and California water rights law was very complex, the possible outcomes of a trial were highly uncertain. Waiting for the judge's decision was risky.

The parties had already spent four years and considerable sums of money on this dispute. A negotiated settlement offered the possibility of minimizing additional expenses. Negotiation was facilitated by the presence of shared counsel; one attorney was either counsel or special counsel for sixteen of the parties. This unusual communication link made it easier to reach a cooperative agreement.

1943 Most parties agreed to appoint a committee of seven attorneys and engineers to work out a stipulated agreement that could be presented to the court. All but two parties agreed to the stipulation which provided:

1) Admission that taking of the water was adverse to the claims other parties, thus satisfying the requirements of a superior prescriptive right;
2) Allocation of the basin's safe yield among the parties;
3) Declaration and protection of each party's right to a specified proportion of the safe yield; and
4) Arrangement for the exchange of pumping rights among parties

On April 5, 1944, Judge Collier designated the Division of Water Resources to serve as watermaster for the stipulation.

1944 Judge Collier signed the judgment on December 23, 1944, adopting the stipulation worked out by the parties. By mid 1944, all of the parties except the California-Michigan Land and Water Company had agreed to the stipulation. His decision is known as "mutual prescription". The judge accepted the determination of a "present unadjusted right" defined as the highest amount of water continuously produced during a five-year period prior to the filing of the lawsuit. Each party owned this right by prescription, and the rights were of equal priority. The judge then defined a "decreed right" for each party which was that party's present unadjusted right adjusted downward about one-third so that the sum of all parties' decreed rights matched the estimated safe yield.

The stipulation and judgment in *Pasadena v. Alhambra* completed the first phase of institution building in Raymond Basin. Water users had constituted a governance structure for the basin through the adjudication process. The stipulation and judgment also established a management program for the basin, within and subject to this basin governance system. The management program was a fairly simple fixed safe-yield operation. The provisions of the stipulation and judgment designated: (1) the set of authorized users of the basin and provided for their entry and exit; (2) assigned them rights to specific quantities of pumped water each year and provided for the exchange, lease or sale of those rights; and (3) limited them in the aggregate to the basin's estimated safe yield.

1945 California-Michigan Land and Water Company appealed the *Pasadena v. Alhambra* judgment and the basic governance structure and management program were quickly called into question. As the judge anticipated, his decision based on the stipulation's idea of mutual prescription was the basis for the California-Michigan Land and Water Company appeal.

1947 In response to California-Michigan's appeal, the District Court of Appeal reverses and remands *Pasadena v. Alhambra.*

1949 In response to an appeal filed to the District Court of Appeals decision, the California Supreme Court affirmed *Pasadena v. Alhambra* overturning the Court of Appeal and affirming the judge's original judgment. The Supreme Court also considered the interests of the various publics served by Raymond Basin water producers. Proportionate reduction by each producer would be less disruptive of the local water economy than the complete elimination of rights for some. Without explicitly endorsing the judge's mutual-prescription reasoning, the Supreme Court sustained his result. This had the effect, intended or not, of adding a new doctrine to California water law.

Although a new doctrine had been added, the California law of water rights had not been overturned or revolutionized. *Pasadena v. Alhambra*

had been decided and affirmed without overruling any previous water rights decisions. Mutual prescription was not substituted for the old scheme, but allowed to develop alongside it. *Pasadena v. Alhambra* provided an alternative capacity in which groundwater users could resolve overdraft problems. With the Supreme Court's approval of *Pasadena v. Alhambra*, a community of water users who had worked out their own settlement of an overdraft could approach a court with some assurance that the judge would recognize the settlement and place public authority behind it. *Pasadena v. Alhambra* allowed users of an overdrafted basin to constitute their own basin governance systems and management programs.

The advent of mutual prescription meant that pumpers in every nonadjudicated basin in the state faced the uncertain situation of not knowing when a basin could become overdrawn. Therefore, the decision in *Pasadena v. Alhambra* had the unintended effect of encouraging pumpers in other basins to increase pumping in order to enlarge and protect their right after a potential adjudication.

1950 City of Pasadena requested redetermination of Raymond Basin safe yield based on observed changes in basin conditions. The court granted the motion on November 17, 1950 and appointed DWR as referee to make the review.

1955 The DWR Report of Referee filed October 5, 1954 increased the estimated safe yield to a total of 30,622 acre feet. The Court issued a Modification of Judgment on April 29, 1955, increasing the decreed rights of the parties proportionally to a total of 30,622 acre feet, effective July 1, 1955.

1974 On January 17, 1974, the second modification of Raymond Basin Judgment was signed allowing parties credit for spreading of canyon diversions in spreading grounds in the vicinity of the Arroyo Seco, Eaton Wash, and Santa Anita Creek Canyon.

Source of above information: "Dividing the Waters" by William Blomquist

1984 On March 26, 1984, the third modification of Raymond Basin Judgment was approved, reconstituting the basin governance system by assigning watermaster responsibilities to Raymond Basin Management Board, successor to the Raymond Basin Advisory Board. The Board's authority to manage storage water in the basin ushered in the era of conjunctive

use and provided the mechanism for local management of the groundwater resource while retaining the safe yield concept of the original adjudication.

1992-1993 On October 7, 1992 and March 10, 1993: Long Term Storage policies were adopted and Basin storage capacity determined and allocated to parties for their use; an important step in allowing all parties to benefit from the storage potential of the Basin.

2001 In July of 2001, by way of a letter to the Chief Executive Officer of Metropolitan Water District, the Raymond Basin Board affirmed their support for conjunctive use in the Basin, once potential negative impacts are identified, evaluated, and resolved.

At the same meeting, the Board approved the proposed concept of the Foothill/Monk Hill Conjunctive Use Program under the following conditions:

1) Five Monk Hill producers that were also member agencies of Foothill Municipal Water District would participate.
2) Storage allotted to the program would be 7,500 acre feet, which was a number equal to 10% of the 75,000 acre feet of storage deemed at that time to be set aside for conjunctive use (CH2 M Hill determined that additional available storage in the Monk Hill was approximately 12,000 acre feet).
3) No imported MWD water could be used for injection unless the TDS is lower than 450 ppm.
4) Foothill and Monk Hill Producers submit the detailed final agreement terms with MWD for the program for Board evaluation and approval prior to issuing the final approval of the program.

2002 On July 10, 2002, the Board took action to conceptually approve the MWD Lead Agency Agreement to enable preparation of environmental documentation for the Pasadena portion of the Raymond Basin Conjunctive Use Program. Additionally, the Board appointed a steering committee to draft a request for proposal to perform a baseline study of the Basin. The study was intended to be used to evaluate the impacts of ongoing and future storage programs in the Basin.

On August 10, 2002, the Board approved the Lead Agency Agreement for the Raymond Basin/MWD Conjunctive Use Program.

2003 The Board approved the proposed concept of the Foothill/Monk Hill Conjunctive Use Program under the following conditions:
1) Five Monk Hill producers that were also member agencies of Foothill Municipal Water District would participate and storage under the program.

2) Storage would be allotted equitably among those agencies.
3) Storage set aside for the program was increased from 7,500 acre feet to 9,000 acre feet with that amount being subtracted from the other conjunctive use program proposed by the City of Pasadena. This would leave 64, 000 acre feet of storage for future consideration as part of the Pasadena Program.
3) No imported MWD water could be used for injection unless the TDS is lower than 450 ppm.
4) Extraction of project water would only occur after Metropolitan placed a call on this stored water as set forth by the guidelines within the final agreement.

The Board engaged Geoscience to prepare the Baseline Groundwater Assessment of the Raymond Basin which included a ground water flow model of the study area.

The City of Pasadena requested that the Pumping and Storage Committee review the applied calculation for spreading credits in the Arroyo and Milliard Canyons. The City requested that the variable calculation in use at the time be replaced with a straight 80% credit for water spread. After extensive review, the Committee recommended that staff use the 80% calculation as an interim method until the impact on water spread for general benefit could be evaluated. The Board approved this approach on July 9, 2003.

During the summer of 2003, an observation well (the Bricker Well) used in calculating the City of Sierra Madre's Salvage Credit went completely dry. After inspection, it was determined that this condition was due to a combination of age and prolonged dry conditions in the Basin. In October of 2003 the Board made two determinations with regards to the Bricker Well:

1) Base calculations for Sierra Madre's Salvage Credit for that year on the assumption that there was zero outflow from the Basin.
2) Direct the City of Sierra Madre to construct a new observation well.

On December 8, 2003, Raymond Basin submitted its first application for $30 million to the Corps of Engineers Section 219 Environmental Infrastructure Program for a raw water supply pipeline, recharge enhancement and additional monitoring wells.

2004 Recognizing conditions highlighted by the ongoing Baseline Groundwater Assessment; the Board authorized staff to assemble a consulting team to seek Federal Grant funding to implement needed water resource enhancement projects for future supply reliability.

In February of 2004, the Baseline Groundwater Assessment of the Raymond Basin was completed. After initial review of the groundwater modeling for the Baseline Groundwater Assessment Geoscience was authorized to prepare partial tracking and capture zone modeling for the same scenarios used in the study. It was also determined that future additional modeling would be required to fully characterize contamination migration.

Baseline Assessment findings indicated that although proposed storage programs would have minimal impact on Basin water levels, the ability for the Basin to sustain production rates in the long-term may not be feasible without increased replenishment. The basin management strategies outlined in the assessment were used to develop projects and concepts meant to eventually stabilized groundwater levels in the Basin.

In July of 2004 the Board of Directors vote to accept a proposal by the Main San Gabriel Basin Watermaster to provide for Anthony Zampiello's continued service as Executive Officer utilizing Watermaster's staff to provide support. The Raymond Basin Management Board's offices officially move to Azusa, CA.

At their September 2004 strategic planning workshop the Board set a goal to obtain $50 Million in outside funding in matching funds for much needed water resource projects in the Basin. After a series of meetings with other local basin managers and water agencies it is determined that a local coalition should be formed to seek Federal funding.

In October of 2004 Raymond Basin Staff and Board members began to actively participate in Regional Technical meetings hosted by the Main San Gabriel Basin Watermaster. These meetings were designed to identify regional water supply issues and possible solutions. The study area included Foothill and Valley Communities stretching from Rancho Cucamonga to La Canada/Flintridge.

Raymond Basin along with other water agencies and municipalities collaborate to develop water supply enhancement projects which are packaged together and called the Southern California Foothill Communities Water Supply Reliability Program (WSRP).
Study projects include:
1) A 14 mile imported replenishment water pipeline from Azusa into the Raymond Basin eventually terminating in northern Pasadena.
2) An inter-connection from the Metropolitan Water District Foothill Feeder to the San Gabriel Valley Municipal Water District's (SGVMWD) pipeline in the San Dimas/La Verne area.
3) Emergency interconnections from the SGVMWD pipeline to the Water Facilities Authority, Three Valleys Municipal Water District and Inland

Empire Utilities Agency treatment plants in the eastern San Gabriel Valley and Inland Empire.
4) The extension of the SGVMWD water delivery system south to the Alhambra, San Gabriel and Monterey Park area to mitigate groundwater production impacts in the area of the Main San Gabriel Basin commonly referred to as the Alhambra Pumping Hole.
5) An area-wide reconnaissance and feasibility study of natural groundwater recharge enhancement opportunities using new and existing facilities within the combined watersheds. The study area includes portions of the Raymond Basin, Main San Gabriel Basin, Six Basins and Chino Basin.

2005 January 12, 2005, Raymond Basin holds a community meeting for State and local elected officials to unveil the Southern California Foothill Communities Water Supply Reliability Program (WSRP).

February 2005, the Board is informed that the Foothill Conjunctive Use Program and City of Pasadena's storage proposal will not include a State Water Project Pipeline extension from the Glendale area. MWD also informs the Board that it will no longer be the lead agency for CEQA purposes on the 64,000 acre foot Pasadena Storage Program.

In October 2005, construction on the Chelsea Well (the Bricker Well replacement) is completed.

2006 Draft Supplemental Water Quality Criteria for Raymond Basin is published in March and distributed to the all parties to the judgment.

May 17, 2006, the MWD Board approves $480,000 to reimburse the City of Pasadena for CEQA review and preliminary design work to develop a 64, 000 acre foot storage program within the Raymond Basin.

July 2006, the Board entered into an Agreement to provide in-kind services as a partner in the Arroyo Watershed Feasibility Study to identify and evaluate potential habitat and water supply restoration projects along the Arroyo Seco Corridor.

October 2006, the Board adopted criteria for supplemental water paving the way for development of replenishment and supplemental water to be stored.

2007 Raymond Basin Management Board and Main San Gabriel Basin Watermaster formed the Foothill Water Coalition (FWC). The main focus of the Coalition is to cooperatively seek Federal and State funding for regional water supply reliability projects. The charter members include the

Raymond Basin Management Board, Main San Gabriel Basin Watermaster, San Gabriel Valley Municipal Water District, Upper San Gabriel Valley Municipal Water District, Three Valleys Municipal Water District, Inland Empire Utilities Agency, Six Basins and Chino Basin Watermaster.

January 2007, Monk Hill Task Force or working group is formed to review and resolve issues unique to the Monk Hill producers and their region.

April 2007, Raymond Basin staff is authorized to act as lead administrative agency for The Water Supply Reliability Coalition, which would eventually become the Foothill Water Coalition.

October 2007, as planned, the Board authorizes work to begin on (Phase I) of comprehensive Ground Water Monitoring and Management Plan, mainly focused on groundwater level and extraction management strategies in the Pasadena Subarea, of the Western Unit.

November 2007, HR 1495- The Water Resources Development Act became United States Law 110-114 on November 9, 2007. Section 5050 of that law authorizes $5 million for Raymond Basin and FWC projects.

2008 January 2008, Recognizing declining water levels and impacts on supply the Board adopted resolution 42-0109. Resolution 42-0109 puts in place self imposed pumping reductions of 30% implemented over five years in the Pasadena Subarea. This resolution was adopted with the goal of a reduction of water produced below 1955 Decreed Rights from 17,843 Acre Feet to 12,493 Acre Feet, dissolution of remaining Long-Term Storage accounts and increased groundwater levels. In order to meet this goal, water production reductions were implemented incrementally at a rate of 1,070 Acre Feet per year for five years until a 30% reduction is achieved. Implementation set to begin July 1, 2009.

July 2008, as Lead Agency for the Foothill Water Coalition, the Raymond Basin Management Board enters into a planning agreement with the Army Corps of Engineers to prepare the project implementation plan for the feasibility and implementation of the Coalition and Raymond Basin suite of water reliability projects.

2009 January 2009, the Board approved Resolution 43-0409 creating the Monk Hill Temporary Perchlorate Clean-up Pool. The Resolution established a temporary storage pool for clean-up of un-produced water in the area of the Raymond Basin, Western Unit, known as the Monk Hill Subarea. The goal is to help mitigate Perchlorate contamination in the Monk Hill

Subarea and retaining water production historically transferred to the area of the Raymond Basin, Western Unit, known as the Pasadena Subarea as Long Term Storage. By establishing the Clean-up Pool (Clean-up Pool) this Resolution is intended as a means to improve water quality and supply conditions in order to avoid disputes between impacted parties.

2010 July 2010, the Board adopted a Joint Prosecution Agreement and Cost-Sharing Agreement regarding a Proposed Rule of the United States Fish and Wildlife Service regarding the designation of a Critical Habitat for the Santa Ana Sucker. The adoption does not bind RBMB with any financial obligation, rather allows participation in a confidential working group.

2011 January 2011, the Board approved membership in the California Groundwater Coalition. The Coalition's mission is to educate policy makers, represent groundwater interests in legislative and other policy areas, and to promote a fair share of funding for statewide programs.

April 2011, the Board adopted revisions to the Rules and Regulations pertaining to discharge credit.

July 2011, the Board approved a contract extension with the Army Corps of Engineers for funding and "in-kind" services match. The extension was based on matching funds whereby the Corps would provide $125,000 toward additional groundwater modeling and basin study, provided RBMB approved an equal amount.

2012 January 2012, the Board adopted revisions to the Rules and Regulations pertaining to annual report distribution consistent with the Judgment.

2013 January 2013, the Board approved the Cooperative Agreement for the Santa Anita Stormwater Flood Management and Seismic Strengthening Project. Participants in this agreement are Los Angeles County, City of Arcadia, City of Sierra Madre, and the Raymond Basin Management Board. The project involves improvements to Santa Anita Dam and existing facilities to better capture stormwater and maximize conservation for the Eastern Raymond Basin.

2014 January 2014, Pasadena Subarea reduction for 2013-14 moved to 30%. The 30% represents the final phase of the planned reduction.

May 2014, the Board submitted a draft Salt and Nutrient Management Plan for the Raymond Basin to the Los Angeles Regional Water Quality Control Board.

June 2014, Monk Hill Temporary Perchlorate Clean-up Pool (Clean-up Pool) five-year term ended.

September 2014, Governor Jerry Brown enacted the Sustainable Groundwater Management Act (SGMA). The act is intended to promote groundwater extraction accountability and stability. The Raymond Basin is named in SGMA as an adjudicated basin, and is required to comply with certain reporting requirements by April 2016.

2015 January 2015, the RBMB approved New Well Construction and Destruction Guidelines. These guidelines are a tool to be used in not only tracking wells, but will also provide a technical basis for better management of groundwater extractions and contamination control. The Board adopted Resolution No. 48-0415 at the April meeting.

April 2015, the RBMB adopted Resolution No. 47-0415 establishing a Short Term Storage Program for Producers meeting specific criteria in the Pasadena Subarea. This provides some flexibility for smaller Producers to "save" and store water during wetter years for use in the subsequent year only.

October 2015, after five years of unprecedented drought, the RBMB authorized the use of imported water for spreading on behalf of the City of Sierra Madre. The Metropolitan Water District entered into an agreement with the City of Sierra Madre and the San Gabriel Valley Water District, to deliver imported water to the Santa Anita Subarea through a connection constructed at the Sierra Madre Spreading Grounds. Water levels in the Santa Anita Subarea have been declining during the prolonged drought due to lack of rainfall and subsequent runoff.

2016 July 2016, the RBMB adopted amendments to the By-Laws that address quorum requirements, terms of office, and the make-up of Executive Committee membership.

December 8, 2016, the Los Angeles Regional Water Quality Control Board, unanimously approved the Raymond Basin Salt and Nutrient Management Plan. This plan is a tool to provide technical assistance in developing various types of alternative water sources for introduction into the Basin.

2018 April 2018, the RBMB awarded a construction contract to drill its first of three planned groundwater monitoring wells. The first well will be constructed in the Santa Anita Subarea, in the City of Arcadia. Well completed in September 2018.

2019 April 2019, the RBMB approved the Pasadena Subarea Alternative Management Scenario No. 1, restricting the use of Long Term Storage in an effort to reduce Basin groundwater decline.

APPENDIX C

SUMMARY OF WATER DIVERSIONS, SPREAD AND PUMPING CREDIT [1/]
(acre feet)

Month/Year	Eaton Canyon Area																			
	Kinneloa Irrigation District											Las Flores Water Company			City of Pasadena Eaton Wash			Rubio Canon Land & Water Association		
	Eaton Wash		Pasadena Glen			Brown Reservoir			Total											
	Diverted	Spread	Diverted	Outflow	Spread	Diverted	Outflow	Spread	Diverted	Spread	**Credit [2/]**	Diverted	Spread	**Credit [2/]**	Diverted	Spread	**Credit [2/]**	Diverted	Spread	**Credit [2/]**
Jul-18	1.2	1.2	5.3	0.0	5.3	0.0	0.0	0.0	6.5	6.5	**5.2**	4.0	4.0	**3.2**	2.3	2.3	**1.8**	2.6	2.6	**2.1**
Aug-18	1.2	1.2	4.5	0.0	4.5	0.0	0.0	0.0	5.7	5.7	**4.6**	4.0	4.0	**3.2**	1.8	1.8	**1.4**	1.3	1.3	**1.0**
Sep-18	1.2	1.2	4.6	0.0	4.6	0.0	0.0	0.0	5.8	5.8	**4.6**	4.0	4.0	**3.2**	1.6	1.6	**1.3**	1.2	1.2	**1.0**
Oct-18	1.2	1.2	5.0	0.0	5.0	0.0	0.0	0.0	6.2	6.2	**5.0**	4.0	4.0	**3.2**	1.4	1.4	**1.1**	1.5	1.5	**1.2**
Nov-18	1.3	1.3	4.9	0.0	4.9	0.0	0.0	0.0	6.2	6.2	**5.0**	4.0	4.0	**3.2**	2.0	2.0	**1.6**	3.1	3.1	**2.5**
Dec-18	1.6	1.6	6.4	0.0	6.4	0.0	0.0	0.0	8.0	8.0	**6.4**	4.0	4.0	**3.2**	38.7	38.7	**31.0**	5.4	5.4	**4.3**
Jan-19	2.0	1.5	7.6	0.0	7.6	0.0	0.0	0.0	9.6	9.1	**7.3**	15.0	11.2	**9.0**	91.3	68.2	**54.6**	25.0	23.6	**18.9**
Feb-19	3.9	1.4	17.2	0.0	17.2	0.0	0.0	0.0	21.1	18.6	**14.9**	24.0	10.0	**8.0**	196.3	81.6	**65.3**	62.1	23.6	**18.9**
Mar-19	2.0	1.1	15.1	0.0	15.1	0.0	0.0	0.0	17.1	16.2	**13.0**	22.0	12.5	**10.0**	230.3	130.6	**104.5**	14.0	9.6	**7.7**
Apr-19	1.7	0.8	8.0	0.0	8.0	0.4	0.0	0.4	10.1	9.2	**7.4**	11.0	5.4	**4.3**	160.7	78.4	**62.7**	1.8	1.7	**1.4**
May-19	1.6	1.2	8.0	0.0	8.0	0.0	0.0	0.0	9.6	9.2	**7.4**	4.0	3.0	**2.4**	142.0	105.4	**84.3**	1.0	0.5	**0.4**
Jun-19	1.5	1.5	7.5	0.0	7.5	0.0	0.0	0.0	9.0	9.0	**7.2**	4.0	4.0	**3.2**	38.7	38.7	**31.0**	0.4	0.4	**0.3**
	20.4	15.2	94.1	0.0	94.1	0.4	0.0	0.4	114.9	109.7	**87.8**	104.0	70.1	**56.1**	907.1	550.7	**440.6**	119.4	74.5	**59.6**

1/ Raymond Basin Management Board computed the diversions and pumping credit; Los Angeles County Department of Public Works determined the spreading amounts.
2/ Based on 80% times amount Spread for all Parties

APPENDIX C

SUMMARY OF WATER DIVERSIONS, SPREAD AND PUMPING CREDIT [3/]
(acre feet)

Month/Year	Arroyo Seco Area															TOTAL EATON CANYON AND ARROYO SECO		
	Lincoln Avenue Water Company[4/]			City of Pasadena[5/]														
				Arroyo Seco			Millard Canyon			PWP Ponds			Total					
	Diverted	Spread	**Credit [6/]**	Diverted	Spread	**Credit [6/]**	Diverted	Spread	**Credit [6/]**	Diverted	Spread	**Credit [7/]**	Diverted	Spread	**Credit**	Diverted	Spread	**Credit**
Jul-18	3.2	3.2	**1.9**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	2.9	2.9	**2.3**	2.9	2.9	**2.3**	21.5	21.5	**16.5**
Aug-18	1.3	1.3	**0.8**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	14.1	14.1	**11.0**
Sep-18	2.1	2.1	**1.3**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	14.7	14.7	**11.4**
Oct-18	3.2	3.2	**1.9**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	16.3	16.3	**12.4**
Nov-18	7.0	7.0	**4.2**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	22.3	22.3	**16.5**
Dec-18	18.8	18.8	**11.3**	0.1	0.1	**0.1**	0.0	0.0	**0.0**	54.7	54.7	**43.8**	54.8	54.8	**43.9**	129.7	129.7	**100.1**
Jan-19	64.6	64.6	**38.8**	0.0	0.0	**0.0**	0.0	0.0	**0.0**	59.2	59.2	**47.4**	59.2	59.2	**47.4**	264.7	235.9	**176.0**
Feb-19	74.1	74.1	**44.5**	345.9	345.9	**207.5**	0.0	0.0	**0.0**	52.3	52.3	**41.8**	398.2	398.2	**249.3**	775.8	606.1	**400.9**
Mar-19	74.1	74.1	**44.5**	735.6	735.6	**441.4**	0.0	0.0	**0.0**	60.7	60.7	**48.6**	796.3	796.3	**490.0**	1,153.8	1,039.3	**669.7**
Apr-19	42.8	42.8	**25.7**	548.4	548.4	**329.0**	0.0	0.0	**0.0**	55.1	55.1	**44.1**	603.5	603.5	**373.1**	829.9	741.0	**474.6**
May-19	25.1	25.1	**15.1**	491.0	491.0	**294.6**	0.0	0.0	**0.0**	1.1	1.1	**0.9**	492.1	492.1	**295.5**	673.8	635.3	**405.1**
Jun-19	15.3	15.3	**9.2**	190.8	190.8	**114.5**	0.0	0.0	**0.0**	63.2	63.2	**50.6**	254.0	254.0	**165.1**	321.4	321.4	**216.0**
	331.6	331.6	**199.0**	2,311.8	2,311.8	**1,387.1**	0.0	0.0	**0.0**	349.2	349.2	**279.5**	2,661.0	2,661.0	**1,666.6**	4,238.0	3,797.6	**2,510.2**

3/ Arroyo Seco and Millard Canyon spreading calculated in accordance with procedures in Attachment A to July 9, 2003 meeting minutes and Raymond Basin Area Spreading Methodology.
4/ Includes La Vina Canyon weir spreading.
5/ All Pasadena diverted and spread data to Arroyo Seco, Millard Canyon and PWP ponds are preliminary and subject to revision.
6/ Based on 60% times amount diverted and spread for Lincoln Avenue Water Company and City of Pasadena (Arroyo Seco & Millard Canyon). Remaining 40% spread for general benefit of basin, as shown on page C-3.
7/ Based on 80% times amount spread for City of Pasadena (PWP Ponds)

APPENDIX C

SUMMARY OF WATER DIVERSIONS, SPREAD AND PUMPING CREDIT [8/]
(acre feet)

Month/Year	Other Spread			**Total Raymond Basin Spread**	General Benefit	
	Los Angeles County Department of Public Works		City of Sierra Madre		Kinneloa Irrigation District, Las Flores Water Company, City of Pasadena and Rubio Canyon Land & Water Association	Lincoln Avenue Water Company and City of Pasadena
	Eaton Grounds	Santa Anita	Little Santa Anita Canyon and street runoff		Eaton Canyon Area General Benefit [9/]	Arroyo Seco Area General Benefit [10/]
Jul-18	0.0	0.0	23.0	44.5	3.1	1.9
Aug-18	0.0	0.0	20.2	34.3	2.6	0.5
Sep-18	0.0	0.0	15.0	29.7	2.5	0.8
Oct-18	0.0	0.0	15.5	31.8	2.6	1.3
Nov-18	0.0	0.0	15.0	37.3	3.1	2.8
Dec-18	0.0	0.0	89.4	219.1	11.2	7.6
Jan-19	201.0	0.0	277.1	714.0	22.4	25.8
Feb-19	1,010.0	74.0	492.4	2,182.5	26.8	168.0
Mar-19	681.0	328.0	556.2	2,604.5	33.8	323.9
Apr-19	281.0	219.0	217.1	1,458.1	18.9	236.5
May-19	26.0	138.0	206.5	1,005.8	23.6	206.4
Jun-19	18.0	74.0	69.3	482.7	10.4	82.4
	2,217.0	833.0	1,996.7	**8,844.3**	161.0	1,057.9

8/ Raymond Basin Management Board computed the diversions and pumping credit.
9/ Based on 20% times amount Kinneloa Irrigation District, Las Flores Water Company, City of Pasadena and Rubio Canyon Land & Water Association diverted in Eaton Canyon Area, as shown on page C-1.
10/ Based on 40% times amount Lincoln Avenue Water Company and City of Pasadena diverted in Arroyo Seco Area and 20% of PWP Ponds, as shown on page C-2.

APPENDIX D

RAYMOND BASIN GROUNDWATER PRODUCTION SUMMARY
JULY 2018-JUNE 2019
(acre-feet)

PARTY NAME													YTD (AF)
Monk Hill Basin	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	**TOTAL**
La Canada Irrigation District	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.39	0.00	0.00	0.00	0.62
Las Flores Water Company	25.76	2.77	29.41	38.11	28.43	17.73	16.91	8.66	12.85	24.49	19.40	22.72	247.24
Lincoln Avenue Water Company	218.34	200.85	194.48	186.96	172.84	127.54	136.34	75.17	63.83	108.54	96.19	103.18	1,684.26
Pasadena, City of	253.02	238.89	233.02	226.26	224.82	226.55	230.88	192.57	100.76	171.55	267.30	246.28	2,611.90
Pasadena Cemetery Association	8.41	10.27	7.03	4.82	4.27	4.77	2.25	0.00	1.21	4.35	2.56	10.00	59.94
Rubio Canon Land & Water Assoc.	225.30	222.21	206.62	182.68	156.53	120.62	97.79	52.84	68.96	123.71	108.30	145.87	1,711.43
Valley Water Company	184.63	179.85	158.87	161.84	76.85	0.38	0.27	0.18	0.20	0.23	161.75	204.51	1,129.56
Subtotals	**915.46**	**854.84**	**829.43**	**800.67**	**663.74**	**497.59**	**484.67**	**329.42**	**248.20**	**432.87**	**655.50**	**732.56**	**7,444.95**
Prior Year	*738.05*	*802.23*	*696.23*	*783.48*	*494.65*	*534.08*	*354.91*	*467.26*	*421.55*	*412.91*	*521.25*	*690.42*	*6,917.02*

Pasadena Sub- w/30% Reduction	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	**TOTAL**
Alhambra, City of	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arcadia, City of	37.99	37.20	34.52	130.67	31.68	34.58	34.18	31.09	37.32	23.44	34.89	41.46	509.02
California-American Water Co.	195.12	250.49	201.86	197.22	252.50	147.24	169.92	119.66	176.90	82.60	97.03	156.78	2,047.32
East Pasadena Water Company	0.11	0.06	0.16	0.11	0.06	0.10	0.20	0.06	0.23	0.32	0.11	0.28	1.80
Huntington Library & Art Gallery	54.01	57.58	40.75	31.34	26.43	2.34	4.63	1.06	6.07	18.92	15.74	30.57	289.44
Kinneloa Irrigation District	76.94	77.03	88.49	77.61	77.74	80.48	26.06	8.19	27.50	46.28	23.89	39.85	650.06
Pasadena, City of	867.03	915.87	889.16	884.04	705.01	304.93	429.42	387.91	433.95	383.19	634.99	516.68	7,352.18
San Gabriel County Water Dist.	97.49	79.82	73.75	71.79	72.55	74.51	73.47	45.59	57.81	65.38	53.69	81.58	847.43
Sunny Slope Water Company	99.81	104.66	88.38	71.51	67.74	69.58	65.90	45.51	79.76	106.76	81.04	84.73	965.38
Subtotals	**1,428.50**	**1,522.71**	**1,417.07**	**1,464.29**	**1,233.71**	**713.76**	**803.78**	**639.07**	**819.54**	**726.89**	**941.38**	**951.93**	**12,662.63**
Prior Year	*1,681.44*	*1,459.09*	*1,353.62*	*1,313.57*	*1,346.48*	*1,027.48*	*835.07*	*864.57*	*883.81*	*884.83*	*1,109.96*	*1,268.37*	*14,028.29*

Western Unit Totals	**2,343.96**	**2,377.55**	**2,246.50**	**2,264.96**	**1,897.45**	**1,211.35**	**1,288.45**	**968.49**	**1,067.74**	**1,159.76**	**1,596.88**	**1,684.49**	**20,107.58**
Prior Year	*2,419.49*	*2,261.32*	*2,049.85*	*2,097.05*	*1,841.13*	*1,561.56*	*1,189.98*	*1,331.83*	*1,305.36*	*1,297.74*	*1,631.21*	*1,958.79*	*20,945.31*

Santa Anita Subarea	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	**TOTAL**
Arcadia, City of	247.73	246.09	239.79	237.52	238.03	239.30	192.28	154.62	195.33	169.67	145.51	13.17	*2,319.04*
Sierra Madre, City of	240.38	236.80	214.30	203.59	201.03	157.53	145.38	107.41	139.15	191.65	175.35	198.47	*2,211.04*
Subtotals	**488.11**	**482.89**	**454.09**	**441.11**	**439.06**	**396.83**	**337.66**	**262.03**	**334.48**	**361.32**	**320.86**	**211.64**	**4,530.08**
Prior Year	*559.35*	*409.44*	*380.04*	*303.18*	*245.44*	*256.38*	*235.86*	*223.35*	*202.85*	*320.78*	*430.40*	*450.33*	*4,017.40*

RAYMOND BASIN TOTALS	**2,832.07**	**2,860.44**	**2,700.59**	**2,706.07**	**2,336.51**	**1,608.18**	**1,626.11**	**1,230.52**	**1,402.22**	**1,521.08**	**1,917.74**	**1,896.13**	**24,637.66**
Prior Year	*2,978.84*	*2,670.76*	*2,429.89*	*2,400.23*	*2,086.57*	*1,817.94*	*1,425.84*	*1,555.18*	*1,508.21*	*1,618.52*	*2,061.61*	*2,409.12*	*24,962.71*

IMPORTED WATER SPREAD / INJECTIONS (July '18 to June '19)													
	JUL	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**TOTAL**
Valley Water Company	0.00	0.00	0.00	0.00	12.20	92.60	0.00	0.00	0.00	0.00	0.00	0.00	**104.80**
Lincoln Avenue Water Company	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
City of Sierra Madre	341.10	341.00	330.00	3.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1,015.35**

Monthly Production Table

Party Name	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Total Well Production
Monk Hill Subarea													
La Canada Irrigation District													
Well No. 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well No. 6	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.39	0.00	0.00	0.00	0.62
Total Production													**0.62**
Las Flores Water Company													
Well No. 2	25.76	2.77	29.41	38.11	28.43	17.73	16.91	8.66	12.85	24.49	19.40	22.72	247.24
Total Production													**247.24**
Lincoln Avenue Water Company													
Well No. 3	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.06	0.10	0.09	0.28
Well No. 5	0.00	0.00	0.00	2.75	0.00	0.05	0.00	1.98	0.00	16.81	96.09	103.09	220.77
Well No. 6	218.34	200.85	194.48	184.21	172.83	127.49	136.34	73.17	63.83	91.67	0.00	0.00	1,463.21
Total Production													**1,684.26**
Pasadena, City of													
Ventura	0.63	0.55	0.45	0.51	0.30	0.75	0.58	0.00	0.48	0.00	0.76	0.00	5.01
Arroyo	251.37	237.58	232.09	225.06	223.81	225.36	229.59	191.79	100.03	171.35	266.36	245.58	2,599.97
Windsor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pasa 52	1.02	0.76	0.48	0.70	0.71	0.44	0.70	0.79	0.25	0.20	0.18	0.70	6.93
Sheldon 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Production													**2,611.91**
Pasadena Cemetary Association													
Well No. 2-3	8.41	10.27	7.03	4.82	4.27	4.77	2.25	0.00	1.21	4.35	2.56	10.00	59.94
Total Production													**59.94**
Rubio Canon Land & Water Association													
Well 4	81.36	80.90	75.44	66.65	56.56	44.32	35.70	0.89	22.40	44.77	39.26	53.15	601.40
Well 7	143.94	141.31	131.18	116.03	99.97	76.30	62.09	51.95	46.56	78.94	69.04	92.72	1,110.03
Total Production													**1,711.43**
Valley Water Company													
Well No. 1	84.92	83.00	70.47	73.78	33.73	0.11	0.10	0.04	0.05	0.07	63.93	92.26	502.46
Well No. 2	99.61	96.76	88.31	87.98	43.04	0.13	0.07	0.06	0.06	0.06	97.72	112.15	625.95
Well No. 3	0.05	0.05	0.05	0.04	0.04	0.06	0.05	0.04	0.05	0.05	0.05	0.05	0.58
Well No. 4	0.05	0.04	0.04	0.04	0.04	0.08	0.05	0.04	0.04	0.05	0.05	0.05	0.57
Total Production													**1,129.56**

Monthly Production Table

Party Name	17-Jul	17-Aug	17-Sep	17-Oct	17-Nov	17-Dec	18-Jan	18-Feb	18-Mar	18-Apr	18-May	18-Jun	Total Well Production
Pasadena Subarea													
Alhambra, City of													
Well No. 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Production													**0.00**
Arcadia, City of													
Chapman 7	0.00	0.00	0.00	102.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.81
Rancho 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hugo Reid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Colorado	37.99	37.20	34.52	27.86	31.68	34.58	34.18	31.09	37.32	23.44	34.89	41.46	406.21
Total Production													**509.02**
California-American Water Company													
Oak Knoll	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Patton	31.70	41.70	32.10	30.90	31.10	5.90	0.00	0.00	0.00	5.90	31.80	26.00	237.10
Lamanda Park- ***Destroyed***	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oswego	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Winston	60.27	79.08	65.14	65.84	91.29	35.41	38.45	19.97	70.31	20.66	2.78	25.76	574.96
Lombardy	103.15	129.71	104.62	100.48	130.11	105.93	131.47	99.69	106.59	56.04	62.45	105.02	1,235.26
Total Production													**2,047.32**
East Pasadena Water Company													
Well No. 7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well No. 8	0.11	0.06	0.16	0.11	0.06	0.10	0.20	0.06	0.23	0.32	0.11	0.28	1.80
Well No. 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Production													**1.80**
Huntington Library & Art Gallery													
Orlando	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Canyon	6.21	5.90	5.78	5.94	2.20	0.00	0.00	0.00	0.00	0.00	0.00	2.97	29.00
Roscoe Moss	2.61	3.42	2.62	0.65	0.00	0.00	0.00	0.01	0.00	0.00	3.40	2.35	15.06
Buddy Moss	45.19	48.26	32.35	24.75	24.23	2.34	4.63	1.05	6.07	18.92	12.34	25.25	245.38
Total Production													**289.44**
Kinneloa Irrigation District													
Wilcox	0.04	0.14	0.10	0.10	0.05	0.08	0.09	0.07	0.06	0.18	0.05	0.07	1.03
Wagner	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K-3	76.90	76.89	88.39	77.51	77.69	80.40	25.97	8.12	27.44	46.10	23.84	39.78	649.03
Total Production													**650.06**

Monthly Production Table

Party Name	17-Jul	17-Aug	17-Sep	17-Oct	17-Nov	17-Dec	18-Jan	18-Feb	18-Mar	18-Apr	18-May	18-Jun	Total Well Production
Pasadena Subarea													
Pasadena, City of													
Copelin 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sunset	157.29	172.66	163.05	163.52	141.93	90.08	84.85	83.61	78.32	53.91	0.00	0.06	1,189.28
Garfield	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Craig	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Woodbury	197.07	195.71	157.38	194.94	125.40	0.19	0.11	0.00	0.00	0.00	0.00	103.94	974.74
Monte Vista	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jourdan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Villa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New Chapman	51.44	31.71	0.00	85.12	81.91	0.05	0.00	0.00	0.00	0.00	8.89	0.00	259.12
Eaton 51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bangham	201.96	181.43	176.27	186.52	181.38	98.61	106.15	89.21	115.56	105.01	205.19	0.00	1,647.29
Twombly	80.67	161.23	221.52	82.10	0.00	91.52	238.31	215.09	240.07	224.27	239.04	232.76	2,026.58
Wadsworth	178.60	173.13	170.94	171.84	174.39	24.48	0.00	0.00	0.00	0.00	181.87	179.92	1,255.17
Total Production													**7,352.18**
San Gabriel County Water District													
Well no 16	97.49	79.82	73.75	71.79	72.55	74.51	73.47	45.59	57.81	65.38	53.69	81.58	847.43
Total Production													**847.43**
Sunny Slope Water Company													
Well No. 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well No. 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well No. 11	75.54	76.36	43.69	8.83	15.01	23.95	26.96	37.60	39.51	106.35	15.70	0.79	470.29
Well No. 12	24.27	28.30	44.69	62.68	52.73	45.63	38.94	7.91	40.25	0.41	65.34	83.94	495.09
Total Production													**965.38**
Santa Anita Subarea													
Arcadia, City of													
Orange Grove 01A	76.58	77.47	74.38	73.37	73.94	69.14	22.93	0.00	0.00	0.98	0.06	0.05	468.90
Orange Grove 02A	109.51	109.60	105.08	102.92	102.51	105.81	105.53	96.26	107.33	99.35	113.51	12.84	1,170.25
Orange Grove 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.22	0.23	0.67
Orange Grove 6	61.64	59.02	60.33	61.23	61.58	64.35	63.82	58.36	88.00	69.12	31.72	0.05	679.22
Anoakia Well 01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Production													**2,319.04**
Sierra Madre, City of													
Well No. 3	1.18	11.14	1.82	14.92	33.79	8.62	16.75	40.98	54.14	73.70	75.14	65.33	397.51
Well No. 4	24.63	24.80	18.17	17.72	34.49	1.84	4.62	15.00	2.83	55.22	13.79	6.84	219.95
Well No. 5	103.61	99.79	95.65	88.05	93.46	75.56	52.67	10.76	8.02	36.43	80.79	70.86	815.65
Well No. 6	110.96	101.07	98.66	82.90	39.29	71.51	71.34	40.67	74.16	26.30	5.63	55.44	777.93
Total Production													**2,211.04**

APPENDIX E

2018-19 WELL APPLICATIONS / CHANGE IN STATUS

Party	Owner Designation	Application Status
New Wells		
Destroyed Wells		
Rubio Canon Land & Water	Well # 2	APPROVED
Rubio Canon Land & Water	Well # 6	APPROVED
Pasadena, City of	Casitas Well # 1	PENDING

APPENDIX F

FOOTHILL CONJUNCTIVE USE PROGRAM

Fiscal Year 2018-19

Party	Storage* @ 6/30/2018 [1/]	Added [2/] Transferred	Loss (1%)	Extracted	Storage* @ 6/30/2019
La Canada Irrigation District	0	0.0	0.0	0.0	0
Las Flores Water Co.	0	0.0	0.0	0.0	0
Lincoln Avenue Water Co.	0	0.0	0.0	0.0	0
Pasadena Cemetery	0	0.0	0.0	0.0	0
Rubio Canon Land & Water	0	0.0	0.0	0.0	0
Valley Water Co.	0	0.0	0.0	0.0	0
TOTAL	**0**	**0.0**	**0.0**	**0.0**	**0**

* Rounding to the nearest acre foot

[1/] 1,971 AF of CSP was converted into FHCUP as of July 1, 2005.

[2/] FHCUP Storage Amounts based on individual agreements with FMWD.

FHCUP Storage may vary according to Annual Operating Plan.

APPENDIX G

Jet Propulsion Laboratories OU-1 System Operational Summary FY 2018-19

STATE WELL NO./ OWNER DESIGNATION	DATE MONTH/YR	ACRE-FEET	METER READING	UNITS/ NOTES
	Jun-18	-BEGINNING-	54035213	GALLONS
EXTRACTION WELL NO. 1	Jul-18	0.00	54035217	
	Aug-18	0.00	54035222	
RECORDATION NO:	Sep-18	0.00	54035229	
	Oct-18	0.00	54035230	
	Nov-18	0.00	54035230	
ESTIMATED FLOW:	Dec-18	0.00	54035238	
X GPM OR X CFS	Jan-19	0.00	54035239	
	Feb-19	0.00	54035239	
REFERENCE ELEV.:	Mar-19	0.00	54035241	
X FEET	Apr-19	0.00	54035248	
	May-19	0.00	54035268	
FLOW CAPAC.: X GPM	Jun-19	0.00	54035281	
	TOTAL ACRE FEET	0.00		

STATE WELL NO./ OWNER DESIGNATION	DATE MONTH/YR	ACRE-FEET	METER READING	UNITS/ NOTES
	Jun-18	-BEGINNING-	445429029	GALLONS
INJECTION WELL NO. 1	Jul-18	9.27	448448395	
	Aug-18	8.04	451067945	
RECORDATION NO:	Sep-18	8.23	453750736	
	Oct-18	8.09	456388116	
	Nov-18	7.30	458767494	
ESTIMATED FLOW:	Dec-18	7.80	461309737	
X GPM OR X CFS	Jan-19	6.00	463264644	
	Feb-19	6.79	465476305	
REFERENCE ELEV.:	Mar-19	9.31	468511389	
X FEET	Apr-19	6.26	470550106	
	May-19	4.60	472050637	
FLOW CAPAC.: X GPM	Jun-19	5.30	473779236	
	TOTAL ACRE FEET	86.99		

STATE WELL NO./ OWNER DESIGNATION	DATE MONTH/YR	ACRE-FEET	METER READING	UNITS/ NOTES
	Jun-18	-BEGINNING-	582234402	GALLONS
EXTRACTION WELL NO. 2	Jul-18	16.32	587553072	
	Aug-18	16.47	592920305	
RECORDATION NO:	Sep-18	15.77	598059531	
	Oct-18	14.89	602911089	
	Nov-18	12.69	607047458	
ESTIMATED FLOW:	Dec-18	15.23	612010906	
X GPM OR X CFS	Jan-19	15.78	617153804	
	Feb-19	14.88	622003306	
REFERENCE ELEV.:	Mar-19	19.15	628241772	
X FEET	Apr-19	15.24	633206839	
	May-19	10.01	636467086	
FLOW CAPAC.: X GPM	Jun-19	0.00	636467086	
	TOTAL ACRE FEET	166.43		

STATE WELL NO./ OWNER DESIGNATION	DATE MONTH/YR	ACRE-FEET	METER READING	UNITS/ NOTES
	Jun-18	-BEGINNING-	86,495,494	GALLONS
INJECTION WELL NO. 2	Jul-18	10.00	89,754,214	
	Aug-18	9.92	92,986,150	
RECORDATION NO:	Sep-18	8.91	95,888,758	
	Oct-18	8.81	98,758,664	
	Nov-18	7.54	101,215,016	
ESTIMATED FLOW:	Dec-18	7.78	103,751,461	
X GPM OR X CFS	Jan-19	5.79	105,636,608	
	Feb-19	8.21	108,312,243	
REFERENCE ELEV.:	Mar-19	9.46	111,394,635	
X FEET	Apr-19	10.54	114,829,237	
	May-19	7.70	117,337,559	
FLOW CAPAC.: X GPM	Jun-19	4.55	118,818,714	
	TOTAL ACRE FEET	99.21		

STATE WELL NO./ OWNER DESIGNATION	DATE MONTH/YR	ACRE-FEET	METER READING	UNITS/ NOTES
	Jun-18	-BEGINNING-	946743105	GALLONS
EXTRACTION WELL NO.3	Jul-18	17.93	952584186	
	Aug-18	18.22	958520939	
RECORDATION NO:	Sep-18	17.65	964271713	
	Oct-18	16.45	969633001	
	Nov-18	15.07	974544655	
ESTIMATED FLOW:	Dec-18	15.76	979680135	
X GPM OR X CFS	Jan-19	11.05	983280562	
	Feb-19	16.75	988737162	
REFERENCE ELEV.:	Mar-19	21.33	995687868	
X FEET	Apr-19	16.91	1001198491	
	May-19	14.02	1005767046	
FLOW CAPAC.: X GPM	Jun-19	18.93	1011934941	
	TOTAL ACRE FEET	200.07		

STATE WELL NO./ OWNER DESIGNATION	DATE MONTH/YR	ACRE-FEET	METER READING	UNITS/ NOTES
	Jun-18	-BEGINNING-	690,524,388	GALLONS
INJECTION WELL NO. 3	Jul-18	16.84	696,012,142	
	Aug-18	17.51	701,716,373	
RECORDATION NO:	Sep-18	12.44	705,769,194	
	Oct-18	11.58	709,543,038	
	Nov-18	10.03	712,812,486	
ESTIMATED FLOW:	Dec-18	12.41	716,857,312	
X GPM OR X CFS	Jan-19	12.47	720,920,761	
	Feb-19	13.25	725,239,310	
REFERENCE ELEV.:	Mar-19	16.99	730,776,211	
X FEET	Apr-19	13.68	735,233,538	
	May-19	10.68	738,712,329	
FLOW CAPAC.: X GPM	Jun-19	7.57	741,178,318	
	TOTAL ACRE FEET	155.45		

NOTES:

1

2

3

IW-3* Discharge to Sewer System:

Meter Reading: Jun 18 = 3727526 gal	Acre Feet	Date:	Gallons:	Acre Feet
3727526	0.00	Jul-18	12,000	0.04
3727526	0.00	Aug-18	12,000	0.04
3727526	0.00	Sep-18	12,000	0.04
3727526	0.00	Oct-18	12,000	0.04
3727526	0.00	Nov-18	12,000	0.04
3727526	0.00	Dec-18	12,000	0.04
3727526	0.00	Jan-19	12,000	0.04
3727526	0.00	Feb-19	12,000	0.04
3727526	0.00	Mar-19	12,000	0.04
3727526	0.00	Apr-19	12,000	0.04
3727526	0.00	May-19	24,000	0.07
3727526	0.00	Jun-19	12,000	0.04
	0.00		156,000	0.48

*Water removed for well maintenance

Extractions and Injection Summary FY 2018-19

Parameter	Units	EW/IW-1	EW/IW-2	EW/IW-3	Total
Total Volume of Groundwater Extracted	Acre Feet	0.00	166.43	200.07	366.50
Total Volume of Groundwater Sent to Sewer	Acre Feet	-	-	-	0.48
Total Volume of Groundwater Reinjected	Acre Feet	86.99	99.21	155.45	341.65
Mass of Perchlorate Removed	lbs.	0.00	4.58	40.99	45.57
Mass of Carbon Tetrachloride (CCl4) Removed	lbs.	0.00	0.26	0.44	0.70
Mass of Trichloroethene (TCE) Removed	lbs.	0.00	0.00	0.05	0.05

All Numbers provided by JPL.

75th Anniversary