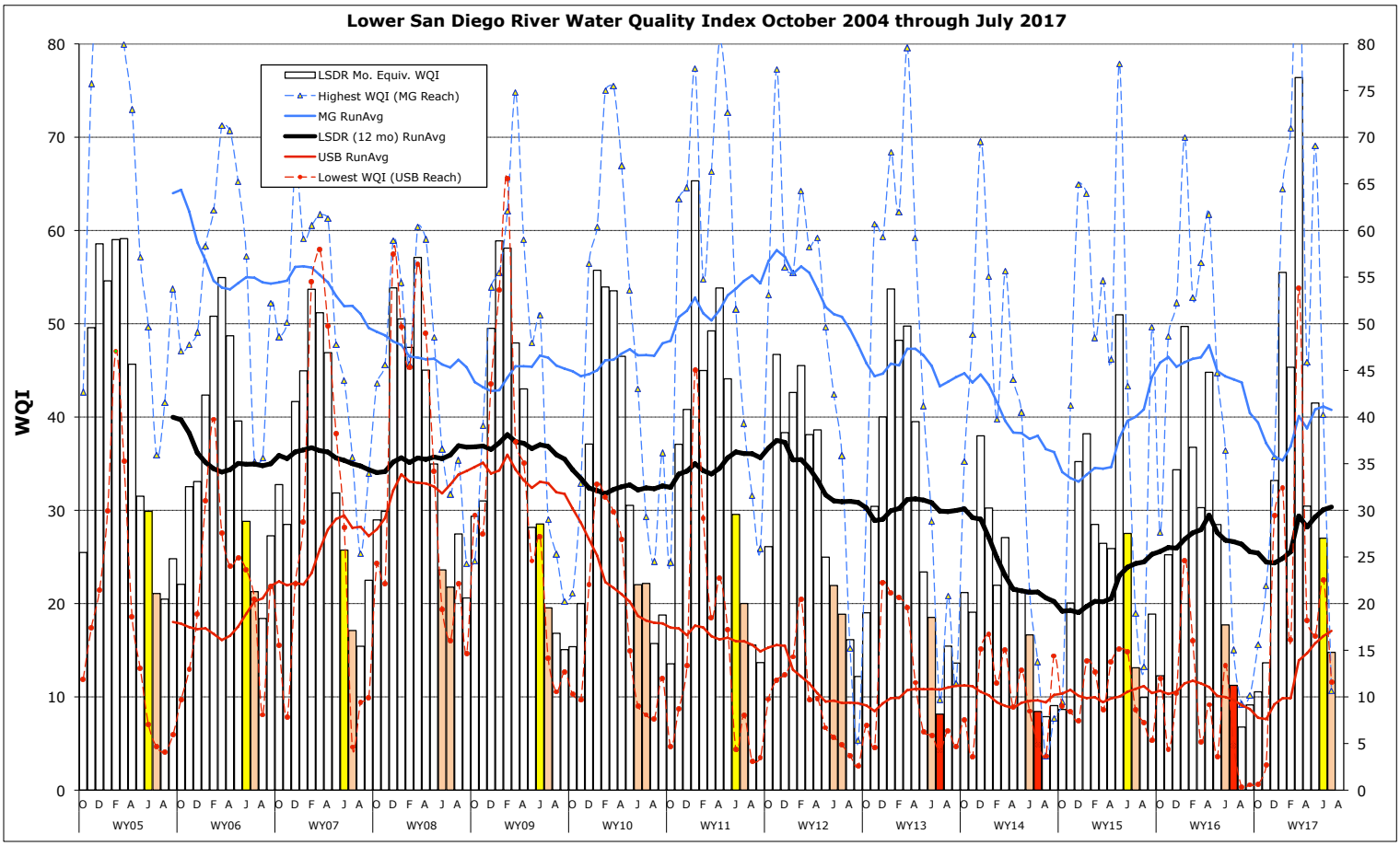
Monthly WQM Report

Lower San Diego River - July 2017



Lower SDR WQ Monitoring Data Summary

Table 1 presents a summary of water quality data monitored by SDRPF's RiverWatch Team within the Lower San Diego River watershed over the past two months (June and July) that constitute the first two months of summer. This year's July index is down 11 points from last month, at a value 3 points higher than last July but 2 points under the 13-yr monthly norm. Overall water quality of the lower hydrologic unit (HSU 907.1) of the watershed for July is rated Poor (E), down from Marginal (D-) last month.

Table 1 - July/June 2017 WQM Data Summery

	West - MV	Mid - MG	East - SB	**LSDR**	Percent Variance from		
[Sites]	[1-7] July/June	[8-10] July/June	[11-15] July/June	**[1-15] July/June**	Last Mo (6/'17)	Last Yr (7/'16)	13-Yr Avg (July)
Temperature, oC	25.5/23.8	24.0/22.1	23.6/23.2	**24.4/23.2**	5%	4%	6%
Sp.Cond., mS/cm	3.31/2.63	2.20/1.87	2.29/2.20	**2.73/2.40**	14%	-9%	1%
DO, mg/L	2.58/3.20	3.47/7.38	3.50/4.49	**3.22/4.42**	-26%	4%	-10%
DO, % of Sat.	32/38	41/85	42/53	**39/52**			
pH	7.72/-	7.76/-	7.80/-	**7.77/-**			
30-day ADF, cfs	2.5/5.0	1.0/2.7	0.5/2.0	**1.3/3.2**	-59%	145%	-53%
WQ Index	18/22	11/40	15/31	**15/27**	-44%	17%	-18%
Grade(Jly/Jun)	E/E	F/C	E/D	**E/D-**			
July 2017/ June 2017	Poor/ Poor	VeryPoor/ Fair	Poor/ Marginal	Poor/ Marginal	**WQI down 12 points from last month**		

Overall, LSDR **water temperatures** are up 1.2 degrees (5%) from last month, a full degree above last July and six percent (1.4 degrees) above the 13-yr monthly norm of 23°C. **Specific conductivity** rose 14% from last month but remains 9% below last July and within 1% of the 13-yr monthly norm of 2.71 mS/cm. The overall **dissolved oxygen** (3.22 mg/L) is down 26% from last month at 4% above last July but remaining 10% percent below the 13-yr monthly norm of 3.62 mg/L. **Streamflow** over the antecedent 30-day period of 1.3 cfs is down 59% from last month at 145% above last July but still 53% below the 13-yr norm of 2.9 cfs. This month's LSDR **water quality index** (WQI) of 15(E) fell 12 points (44%) from last month's value of 27(D-) to 2 points within a year ago July and 3 points below the 13-yr monthly norm of 18(E).

Conclusion:

The Lower San Diego River water quality index fell 12 points (44%) from **27 (D) Marginal to 15 (E) Poor** over the past month.

A summary of monthly WQI values occurring over the past two years of record for the three sections of the lower river system as well as the overall LSDR average are listed in **Table 2** along with average daily flow (ADF) and total monthly rainfall (MRF).

Table 2 - WQI Values, Average Daily Flow and Monthly Rainfall (June 2015 - June 2017)

	Mission Valley	Mission Gorge	Santee Basin	LSDR		ADF, cfs	MRF, in
July'15	12(F)	19(E)	15(E)	15(E)		9.5	1.71
Aug	8(F)	13(E-)	15(E)	12(F+)	DW	2.7	0.00
Sept	8(F)	50(B-)	32(D)	26(D-)		5.5	1.25
Oct	5(F)	28(D)	17(E)	14(E)		4.9	0.42
Nov	28(D)	49(C+)	20(E)	29(D)		7.8	1.53
Dec.	40(C)	52(B)	29(D)	38(C-)		7.5	0.45
Jan.'16	54(B)	70(B)	42(C)	52(B)	WW	92.7	3.21
Feb.	40(C)	53(B)	35(D)	40(C)		12.3	0.05
March	32(D)	57(B)	25(D-)	34(D)		14.0	0.72
April	63(B)	62(B)	30(D)	49(C+)		11.5	0.55
May	38(C)	45(C)	26(D-)	34(D)		5.8	0.43
June	14(E)	36(D)	18(E)	20(E)	DW	1.2	0.02
July	14(E)	15(E)	12(F+)	13(E-)	DW	0.6	0.00
Aug	10(F)	9(F)	6(F)	8(F)	DW	0.4	0.00
Sept	12(F+)	10(F)	12(F+)	12(F+)	DW	0.4	0.32
Oct	13(E-)	16(E)	13(E-)	13(E-)	DW	0.8	0.07
Nov.	16 (E)	23(E)	14(E)	14(E)		1.2	0.61
Dec.	27(D)	36(D)	37(D+)	33(D)	WW	19.4	4.22
Jan. '17	62(B)	64(B)	49(C+)	56(B)	WW	128.2	3.01
Feb.	49(C+)	71(B)	36(D+)	45(C)	WW	122.8	3.14
March	82(A)	95(A+)	63(B)	76(A-)	WW	176.6	0.07
April	31(D)	46(C)	28(D)	30(D)		9.2	0.02
May	43(C)	69(B)	34(D)	41(C)		17.8	0.92
June	22(E)	40(C)	31(D)	27(D-)		3.2	0.00
July'17	18(E)	11(F)	15(E)	15(E)	DW	1.3	0.00

The **cover page** chart presents monthly WQI values and their range (high-low) for the Lower San Diego River as determined over the past 13 years of RiverWatch monitoring. June and July values for each of the years are expressed as color-shaded bars. Running average index values for LSDR (for all sites) are shown as a heavy black line. Monthly values for the consistently highest/best quality reach (Mission Gorge) are shown as a blue line while the consistently lowest/poorest reach (Upper Santee Basin) are shown in red. The overall upward trend in the index over the past seven months of 2017 has reversed. Dry-weather conditions now prevail. Surface flow is now absent at two upper Santee Basin sites; RCP/Cottonwood (14) and Sycamore Ck/Santee Lakes (12). Base flow from groundwater return is also rapidly diminishing.

Monthly WQI values extending from Oct. 2004 through July 2017 are presented in **Chart 1** (next page) together with 12-month running averages (trend-lines) for each of the five principal reaches of the river and overall (i.e., for Lower SDR). The current running average WQI for the LSDR of 32 is only 4% below the 13-yr annual norm. A year ago (June 2016) the running average WQI was 16% below the 12-yr norm. The improved DO values monitored throughout all reaches of the lower river system associated with this year's wet-weather months (Dec-March) are now declining quite rapidly with the return to typical dry-weather conditions.

Monthly and 12-mo. running average WQI values for the poorest reach (Upper Santee Basin) and best Mission Gorge section (Sites 8-10) are presented in **Chart 2** also on next page. Although water quality has improved to some extent in the Upper Santee Basin, resurgent growths of invasive aquatic plants such as floating primrose-willow (*Ludwigia hextapetala*) are currently on the upsurge.

Spatial WQI results by site for the past three months of monitoring are shown on **Charts 3, 4 and 5** on page 6. July WQI values (color bars w/index values in black) have declined significantly from June and May. During May of this year sixty percent (9 of 15) of the sites were in the Fair (C) range (WQI>37) while four more (27%) were Good (B). During June, five of 13 sites were Poor (4) to Very Poor (1) while six were Marginal and just two were Fair. Only two sites were found in the Marginal category this month while the remaining 12 (86%) were in the Poor (8) to Very Poor (4) range. Further declines in water quality at most sites are anticipated throughout the remaining months of summer.

The overall water quality index is expected to further decline over the next few months at most monitoring sites based on diminished dissolved oxygen levels and streamflow in conjunct with increased specific conductivity and high water temperatures. Dissolved oxygen concentrations are anticipated to reach hypoxic levels (<2.5 mg/L or 30% Sat) throughout multiple portions of the lower river this coming month.

jck (7/25/2017)

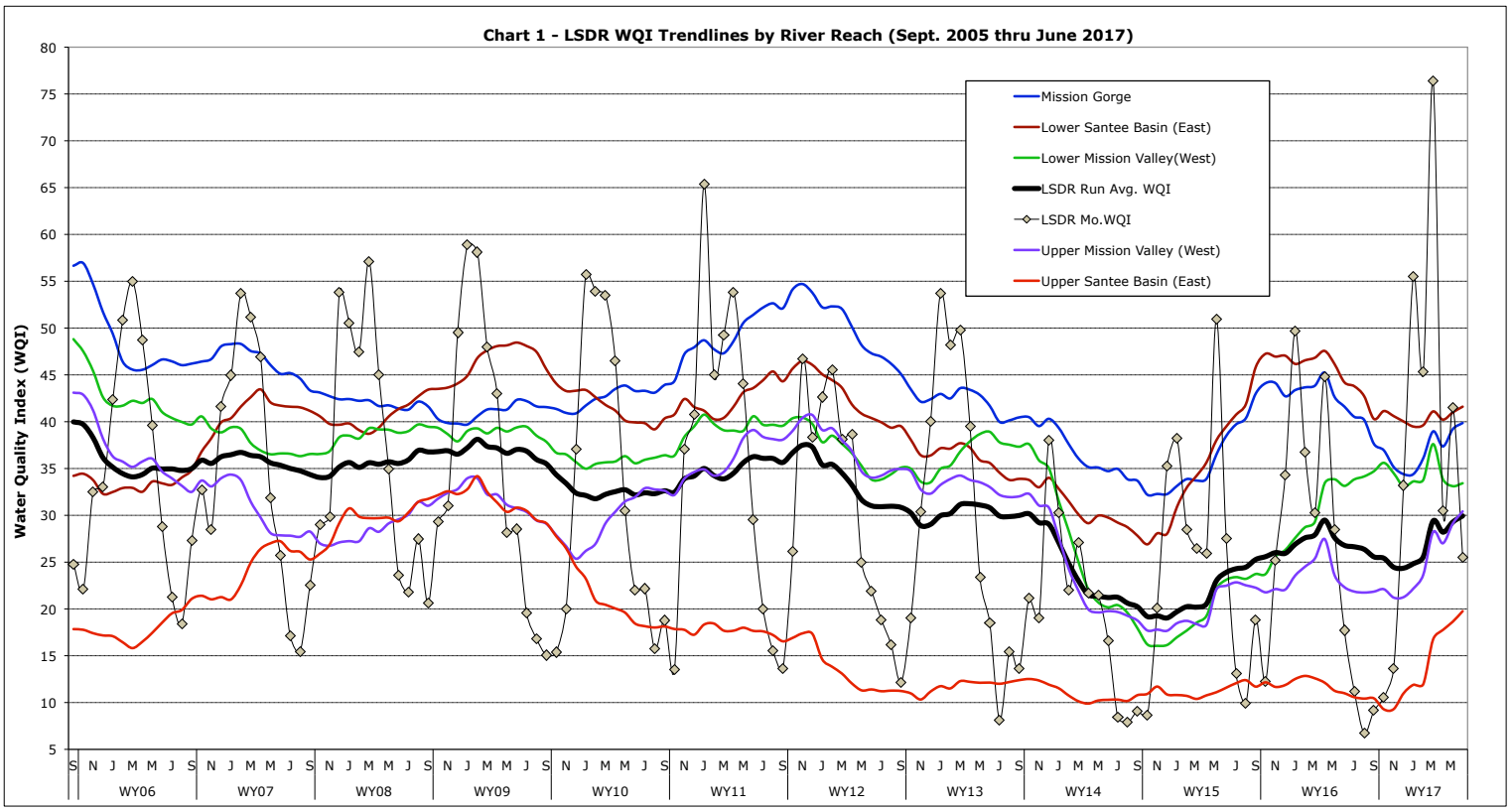


Chart 1 - LSDR WQI Trendlines by River Reach (Sept. 2005 thru June 2017)
Water Quality Index (WQI)
Mission Gorge
Lower Santee Basin (East)
Lower Mission Valley(West)
LSDR Run Avg. WQI
LSDR Mo.WQI
Upper Mission Valley (West)
Upper Santee Basin (East)
WY06
WY07
WY08
WY09
WY10
WY11
WY12
WY13
WY14
WY15
WY16
WY17

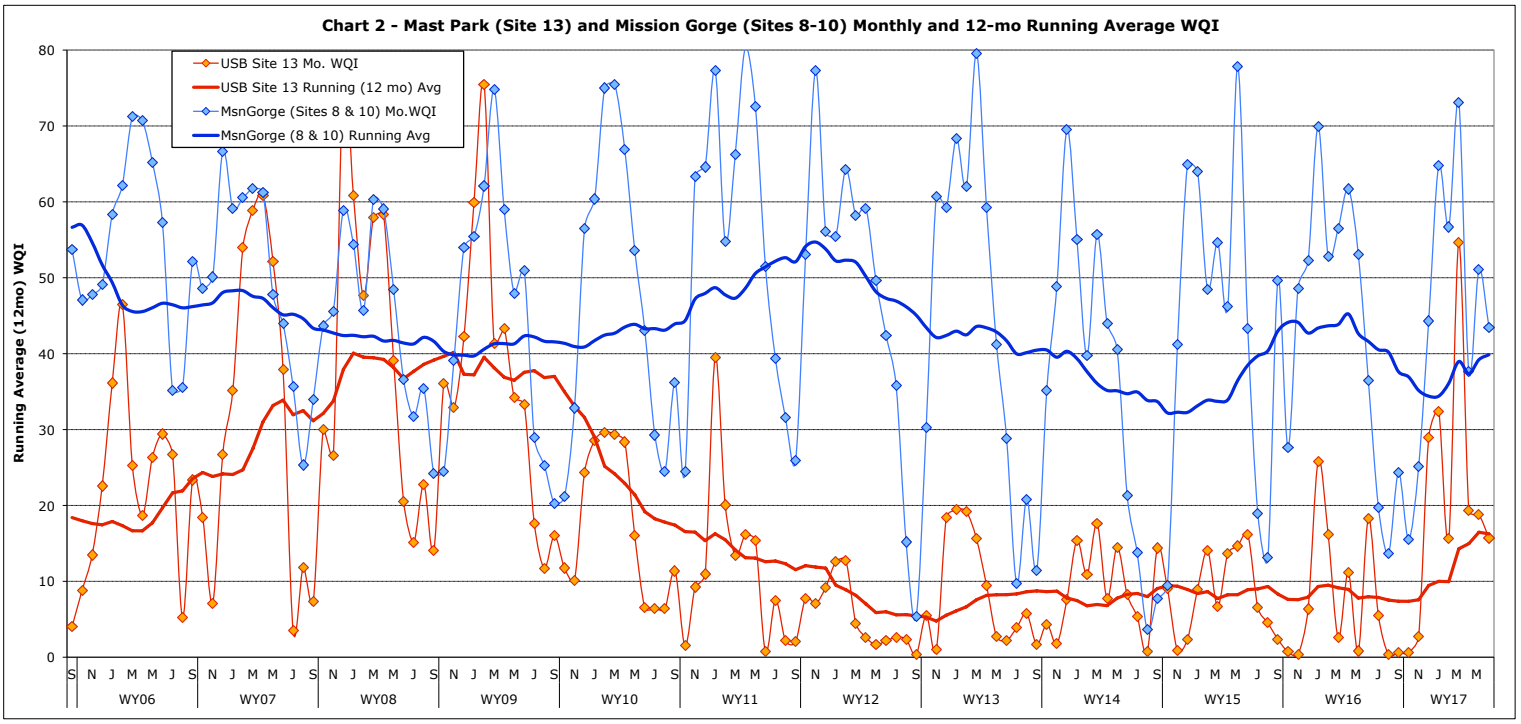


Chart 2 - Mast Park (Site 13) and Mission Gorge (Sites 8-10) Monthly and 12-mo Running Average WQI
Running Average (12mo) WQI
USB Site 13 Mo. WQI
USB Site 13 Running (12 mo) Avg
MsnGorge (Sites 8 & 10) Mo.WQI
MsnGorge (8 & 10) Running Avg
WY06
WY07
WY08
WY09
WY10
WY11
WY12
WY13
WY14
WY15
WY16
WY17

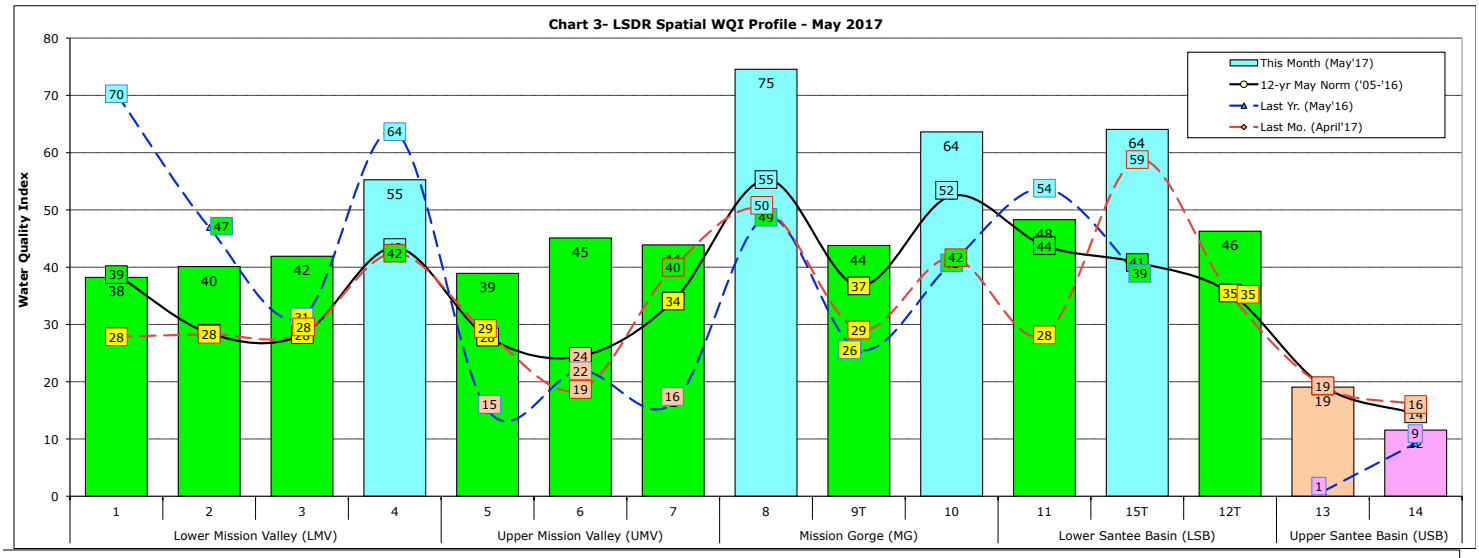


Chart 3- LSDR Spatial WQI Profile - May 2017
Water Quality Index
This Month (May'17)
12-yr May Norm ('05-'16)
Last Yr. (May'16)
Last Mo. (April'17)
Lower Mission Valley (LMV)
Upper Mission Valley (UMV)
Mission Gorge (MG)
Lower Santee Basin (LSB)
Upper Santee Basin (USB)

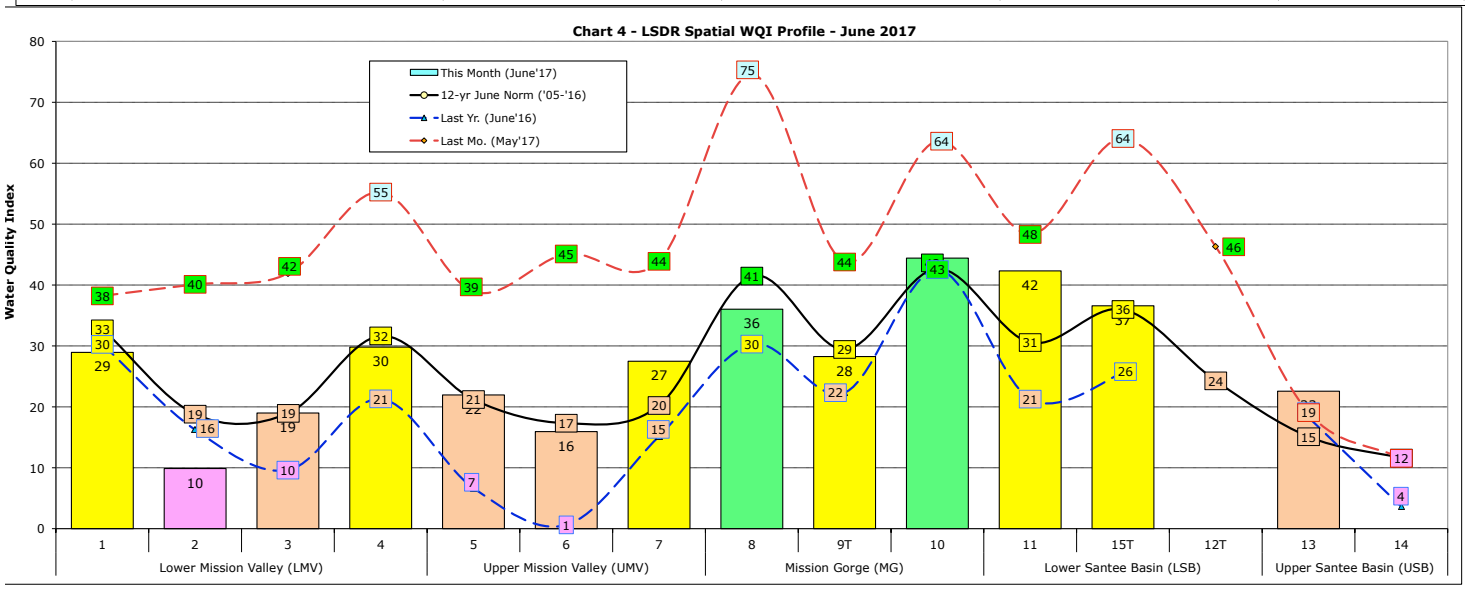


Chart 4 - LSDR Spatial WQI Profile - June 2017
Water Quality Index
This Month (June'17)
12-yr June Norm ('05-'16)
Last Yr. (June'16)
Last Mo. (May'17)
Lower Mission Valley (LMV)
Upper Mission Valley (UMV)
Mission Gorge (MG)
Lower Santee Basin (LSB)
Upper Santee Basin (USB)

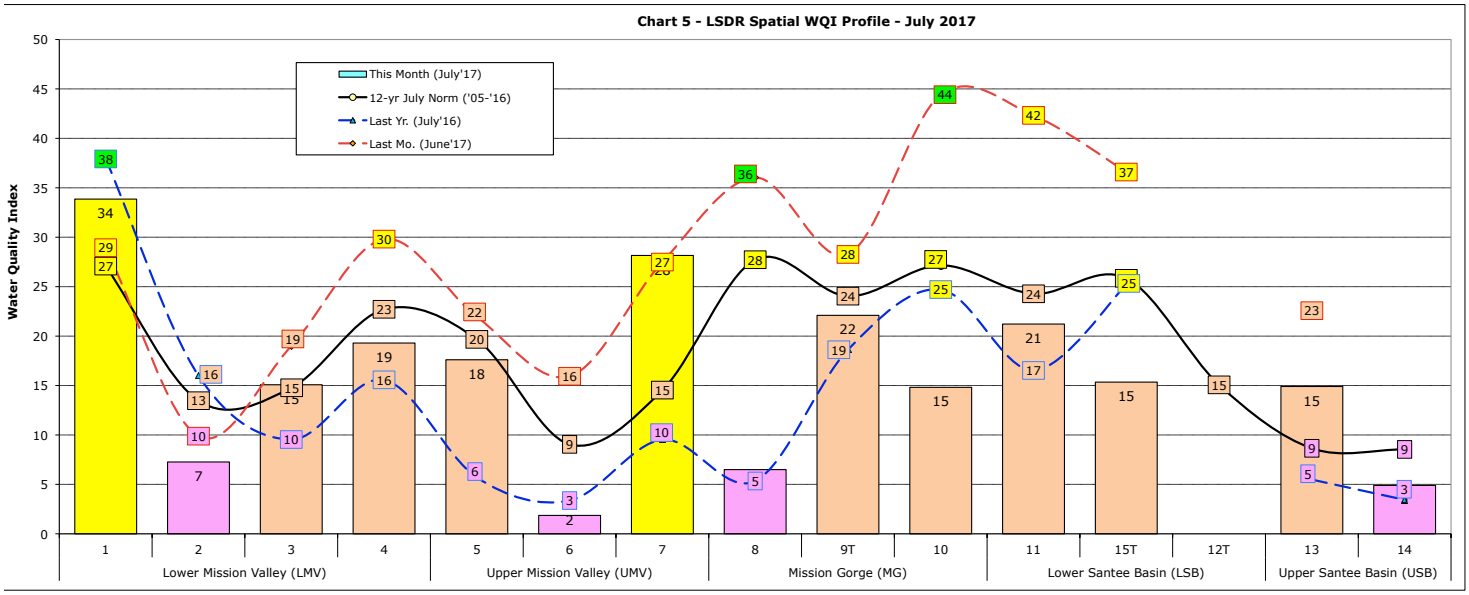


Chart 5 - LSDR Spatial WQI Profile - July 2017
Water Quality Index
This Month (July'17)
12-yr July Norm ('05-'16)
Last Yr. (July'16)
Last Mo. (June'17)
Lower Mission Valley (LMV)
Upper Mission Valley (UMV)
Mission Gorge (MG)
Lower Santee Basin (LSB)
Upper Santee Basin (USB)