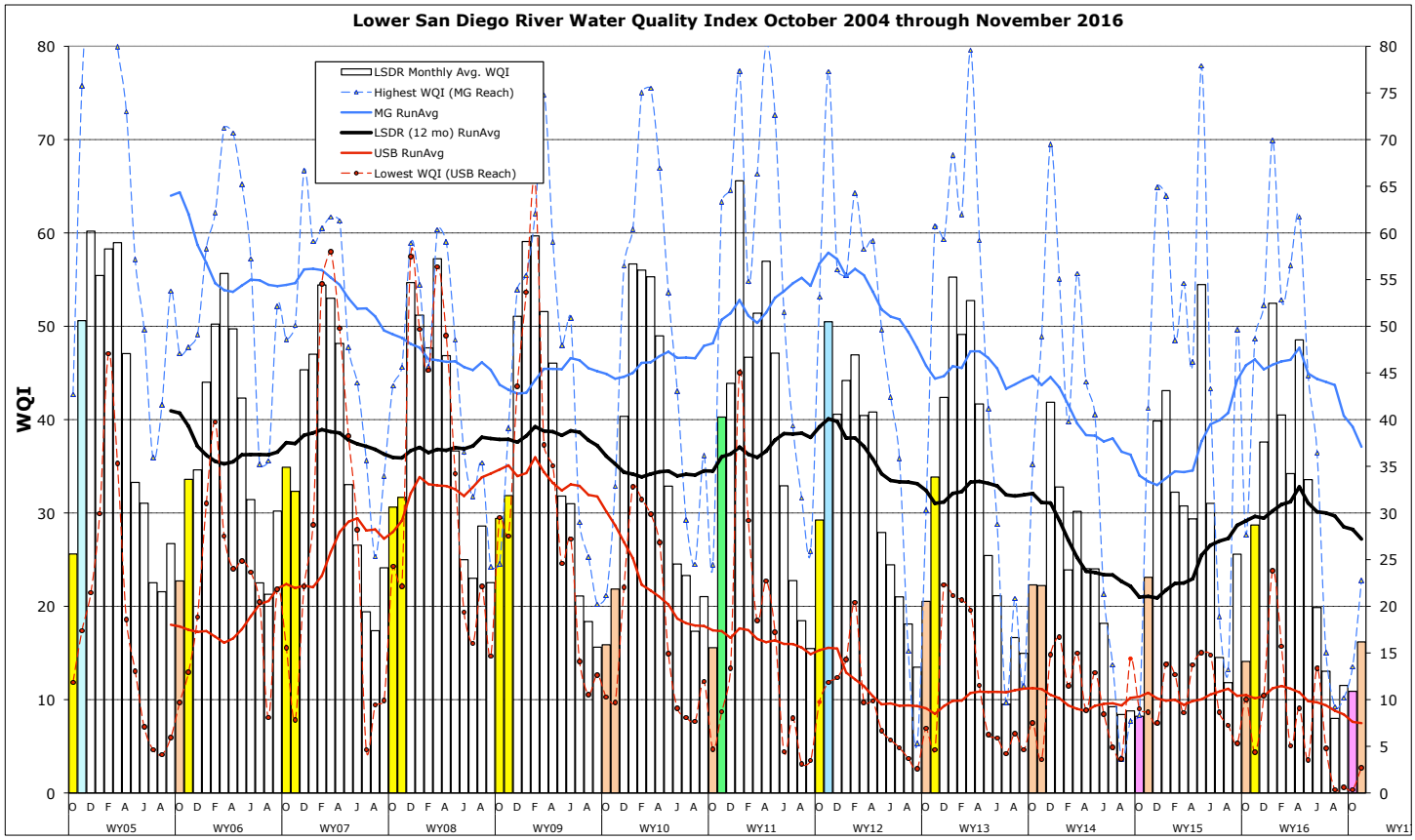
Monthly WQM Report

Lower San Diego River - November 2016



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. October and November constitute the two months of fall and the beginning of the new water year (WY17). This month's index values are about the same as last month, but remain lower than last November and well below the 12-yr monthly norms for all sections of the river. General water quality of the lower hydrologic unit (HSU 907.1) remains Poor.

Table 1 - November/October 2016 WQM Data Summery

	West - MV	Mid - MG	East - SB	**LSDR**	Percent Variance from		
[Sites]	[1-7] Nov/Oct	[8-10] Nov/Oct	[11-15] Nov/Oct	**[1-15] Nov/Oct**	Last Mo (10/'16)	Last Yr (11/2015)	12-Yr Avg (Nov.)
Temperature, oC	15.6/18.0	13.8/17.1	15.1/17.7	**15.0/17.6**	-15%	11%	1%
Sp.Cond., mS/cm	3.45/3.46	2.61/2.62	2.61/2.63	**3.16/3.16**	0%	48%	24%
DO, mg/L	3.07/2.32	5.96/4.18	5.23/5.04	**4.10/3.17**	28%	-25%	-30%
DO, % of Sat.	31/25	57/43	53/52	**41/33**			
pH	7.62/7.69	7.78/7.73	7.63/7.74	**7.62/7.69**	-1%	-10%	-2%
ADF, cfs	1.3/1.3	0.8/1.0	0.6/0.8	**0.9/1.0**	-9%	-70%	-80%
WQ Index	16/13	23/16	14/13	**16/13**	24%	-43%	-51%
Grade(Nov/Oct)	E/E-	E/E-	E-/F	**E/F+**			
November 2016	Poor	Poor	Poor	Poor	**Up 3 pts from last mo.**		

DO values in red indicate general hypoxic (DO < 4 mg/L) conditions.

Overall, LSDR **water temperatures** are down 2.6 degrees Celsius (-15%) from last month, but still 1.5 degrees above than last Nov. (13.5° C) and only 1 percent above the 12-yr norm (14.9° C). **Specific conductivities** are unchanged from last month and remain 48% above last Nov. and 24% higher than the 12-yr monthly norm. **Dissolved oxygen** levels are up 28% from last month, but 25% below last Nov. and 30% less than the 12-yr monthly norm of 6.00 mg/L. **Streamflow** declined 9% from last month and remains 70% below last November and 80% less than the 12-yr norm. This month's LSDR **water quality index** (WQI) of 16(E) is up 3 points (49%) from last month's value of 13(E-), but remains 43% less than a year ago and 51% below the 12-yr November norm of 33 (D).

Conclusion:

The Lower San Diego River water quality index increased by 3 points, rising from **13 (E- Poor) to 16 (E Poor)** over the past 30 days.

A summary of WQI values occurring over the past two years of record for the three main 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 (Nov. 2014 - Nov. 2016)

	Mission Valley	Mission Gorge	Santee Basin	LSDR		ADF, cfs	MRF, in
Nov'14	12(F+)	41(C)	24(E+)	23(E)		3.1	0.37
Dec	35(D)	65(B)	32(D)	40(C)	WW	35.6	4.5
Jan.'15	37(D+)	64(B)	39(C-)	43(C)		10.3	0.38
Feb.	28(D)	48(C+)	29(D)	32(D)		6.1	0.18
March	24(E+)	55(B)	26(D-)	31(D)		14.6	0.93
April	24(E+)	46(C)	27(D-)	29(D)	DW	2.2	0.02
May	55(B)	78(A-)	41(C)	54(B)		13.3	2.4
June	26(D-)	43(C)	31(D)	31(D)	DW	2.1	0.01
July	12(F)	19(E)	15(E)	15(E)		14.9	1.71
Aug	8(F)	13(E-)	15(E)	12(F+)	DW	1.4	0.00
Sept	8(F)	50(B-)	32(D)	26(D-)		6.0	1.25
Oct	5(F)	28(D)	17(E)	14(E)		4.2	0.42
Nov	28(D)	49(C+)	20(E)	29(D)		8.9	1.53
Dec.	40(C)	52(B)	29(D)	38(C-)		13.2	0.45
Jan.'16	54(B)	70(B)	42(C)	52(B)	WW	89.8	3.21
Feb.	40(C)	53(B)	35(D)	40(C)		8.9	0.05
March	32(D)	57(B)	25(D-)	34(D)		13.9	0.72
April	63(B)	62(B)	30(D)	49(C+)		11.9	0.55
May	38(C)	45(C)	26(D-)	34(D)		5.6	0.43
June	14(E)	36(D)	18(E)	20(E)	DW	0.9	0.02
July	14(E)	15(E)	12(F+)	13(E-)	DW	0.5	0.00
Aug	10(F)	9(F)	6(F)	8(F)	DW	0.3	0.00
Sept	12(F+)	10(F)	12(F+)	12(F+)	DW	1.9	0.32
Oct	13(E-)	16(E)	13(E-)	13(E-)	DW	1.6	0.07
Nov.'16	16 (E)	23(E)	14(E)	16(E)	DW	1.6	0.61

WQI values are expected to increase at most monitoring sites over the next month with recurrence of wet-weather.

The **cover page** chart presents monthly WQI values and their range (high-low) for the Lower San Diego River determined over the past 12 years of RiverWatch monitoring. The October and November values for each of the past 12 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. This month and last month's values are the lowest recorded over the past 12 years for October and November.

Monthly WQI values extending from Oct. 2005 through Nov. 2016 are presented in **Chart 1** (next page) together with 12-month running averages (trend-lines) for each of the five individual reaches and overall (i.e., for the LSDR). The current overall running average WQI for the LSDR of **27** is 19% below the 12-yr annual norm of 34. Although there were measurable improvements in water quality for multiple reaches of the lower river watershed through Winter and early Spring, rather poor water quality conditions have persisted throughout the last six months of dry weather, most notably in the upper (eastern) reach of the Santee Basin segment, while conditions in the Lower Santee and Mission Gorge segments have also declined from a year ago.

Monthly and 12-mo. running average WQI values for the poorest site (13-Mast Park) and best Mission Gorge reach (Sites 8-10) are presented in **Chart 2** (also on next page). Water quality at Sites 13 and 14 remain Very Poor (F-). Excessive growth of the invasive non-native aquatic plant, floating primrose-willow (*Ludwigia hextapetala*) observed throughout many of the slower-moving reaches of the river, is considered a major contributor of recurrent dissolved oxygen deficits (DO < 4.0 mg/L) and resultant poor-to-very poor water quality index values during the past five years. Average daily flow in the lower segment of the river has remained less than 1 cubic foot per second over the last 30-days.

Spatial WQI results for the past three months of monitoring are shown in **Charts 3, 4 and 5** on page 6. WQI values (color bars w/index values in black) have changed most noticeably in the upper Mission Valley and Mission Gorge reaches. Eleven of 14 sites are in the Very Poor (3) or Poor (8) range this month. There remains no flow at site 14-Cottonwood/RCP. Forester Creek was the only site monitored in the Fair (C) range. The Pacific Highway (estuary) and Old Mission Dam (#10) sites were monitored in the Marginal (D) range.

Water quality index values can be expected to improve over the next month at most monitoring sites assuming considerably greater streamflows, lowered water temperatures and improved dissolved oxygen levels. Dissolved oxygen values at multiple sites are likely to remain above hypoxic levels (4 mg/L or greater) throughout the daylight hours. Some sites, however, are expected to remain lower with DO levels under 4 mg/L. Overall LSDR water quality is expected to improve from Poor (E) to Marginal (D) and possibly Fair (C), depending on the amount of flow.

jck (11/21/2016)

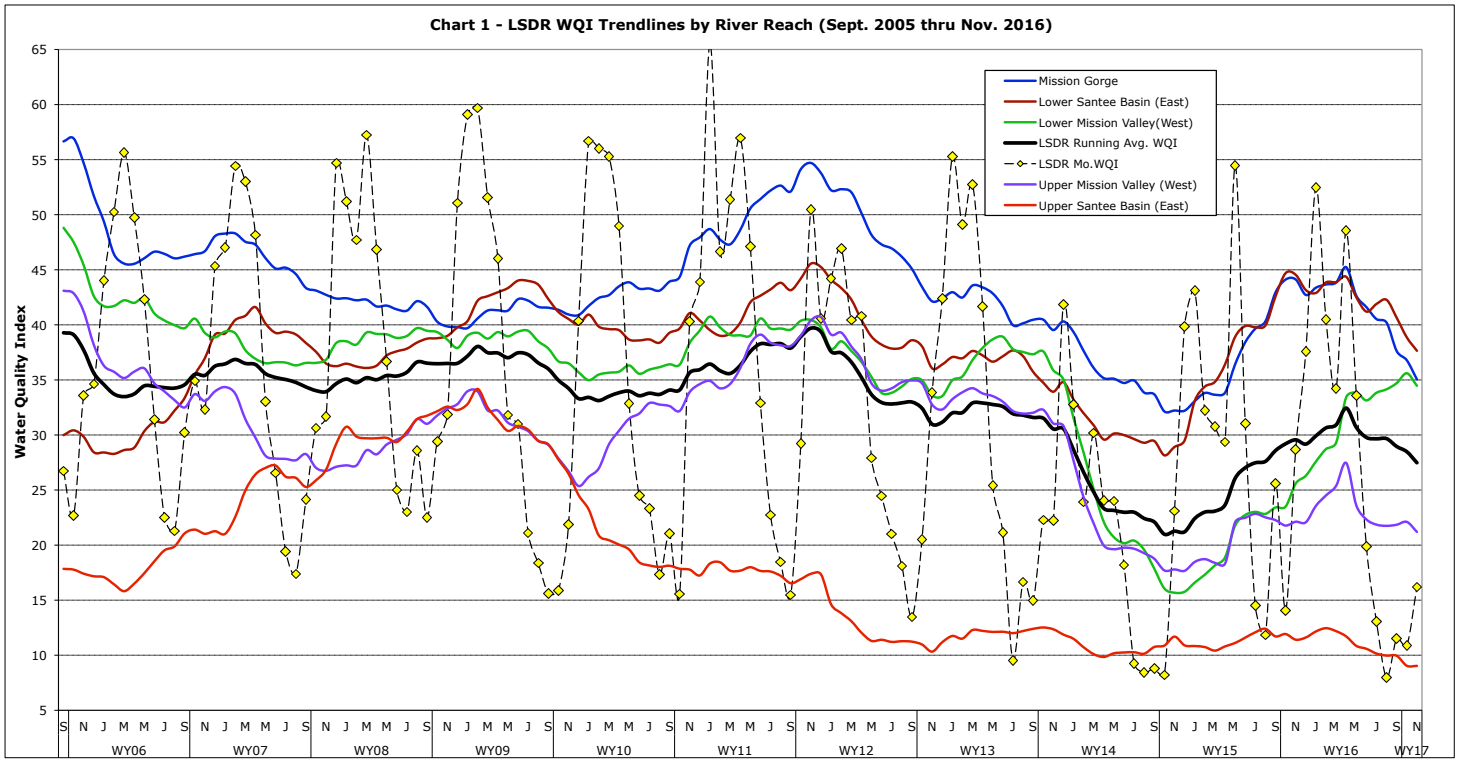


Chart 1 - LSDR WQI Trendlines by River Reach (Sept. 2005 thru Nov. 2016)
Water Quality Index
Mission Gorge
Lower Santee Basin (East)
Lower Mission Valley(West)
LSDR Running Avg. WQI
LSDR Mo.WQI
Upper Mission Valley (West)
Upper Santee Basin (East)
WY06
WY07
WY08
WY09
WY10
WY11
WY12
WY13
WY14
WY15
WY16
WY17

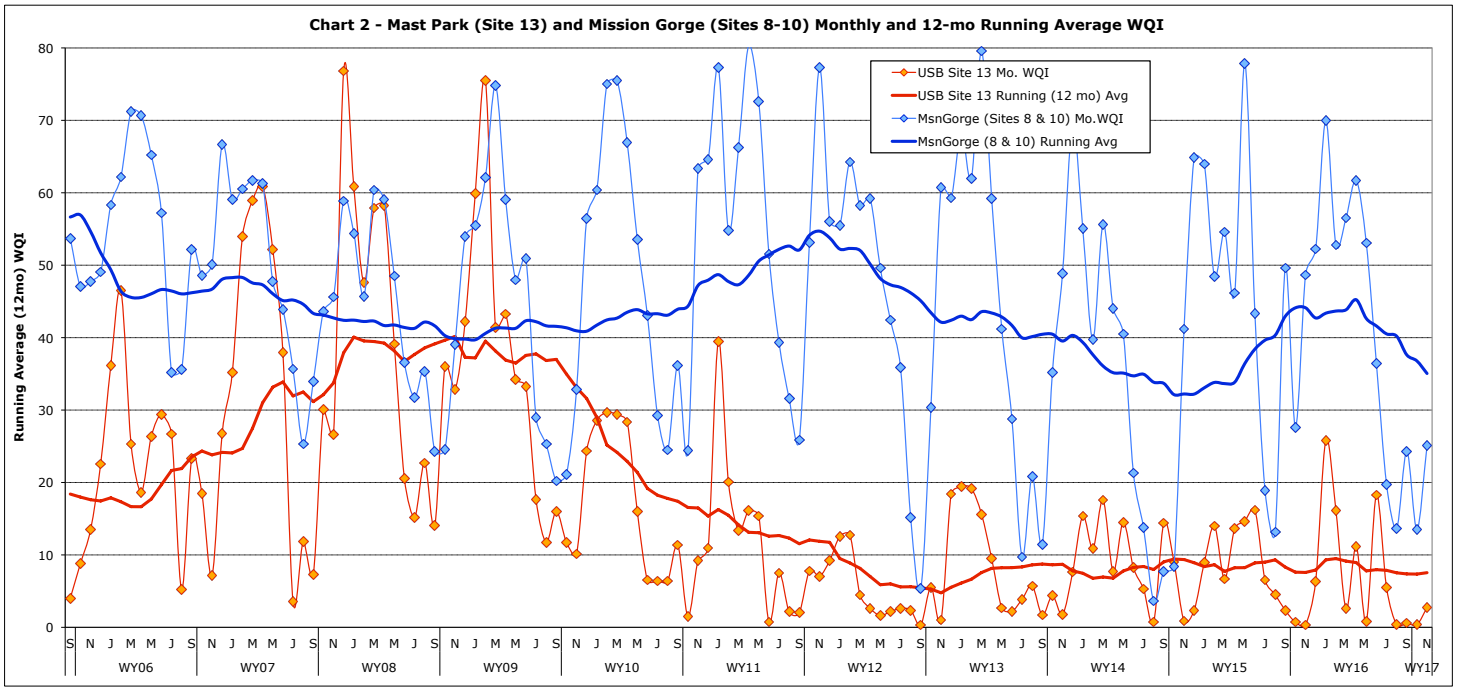


Chart 2 - Mast Park (Site 13) and Mission Gorge (Sites 8-10) Monthly and 12-mo Running Average WQI
Running Average (12mo) WQI
USB Site 13 Mo. WQI
USB Site 13 Running (12 mo) Avg
MsnGorge (Sites 8 & 10) Mo.WQI
MsnGorge (8 & 10) Running Avg
WY06
WY07
WY08
WY09
WY10
WY11
WY12
WY13
WY14
WY15
WY16
WY17

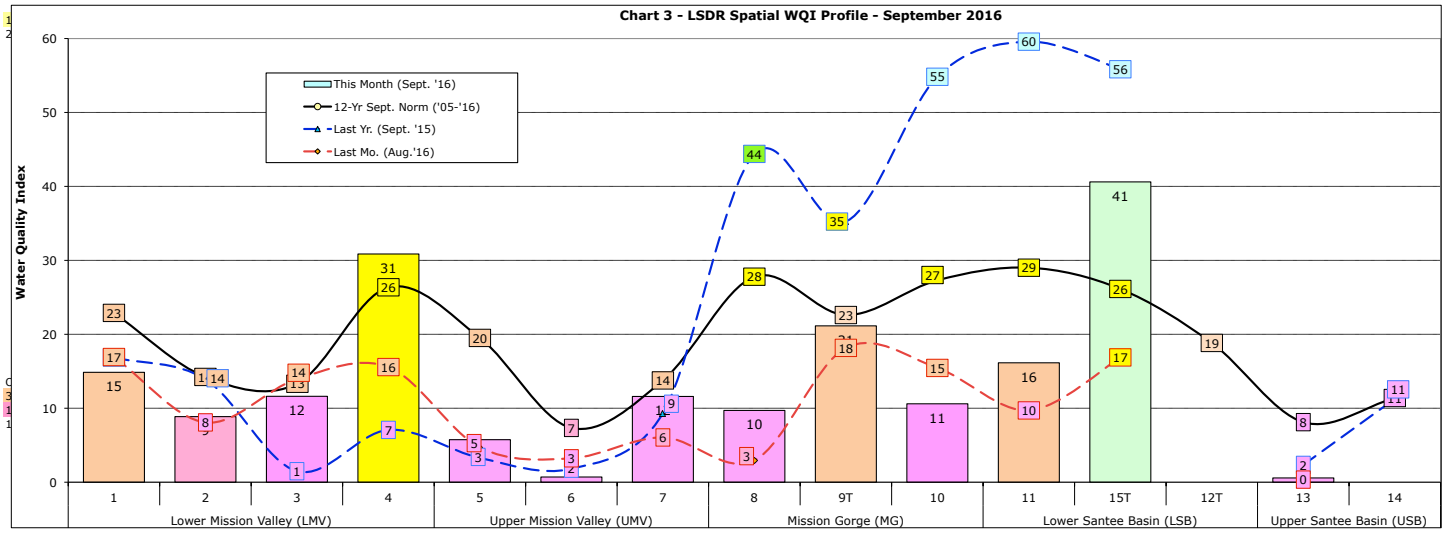


Chart 3 - LSDR Spatial WQI Profile - September 2016
Water Quality Index
This Month (Sept. '16)
12-Yr Sept. Norm ('05-'16)
Last Yr. (Sept. '15)
Last Mo. (Aug.'16)
1 2 3 4 5 6 7 8 9T 10 11 15T 12T 13 14
Lower Mission Valley (LMV)
Upper Mission Valley (UMV)
Mission Gorge (MG)
Lower Santee Basin (LSB)
Upper Santee Basin (USB)

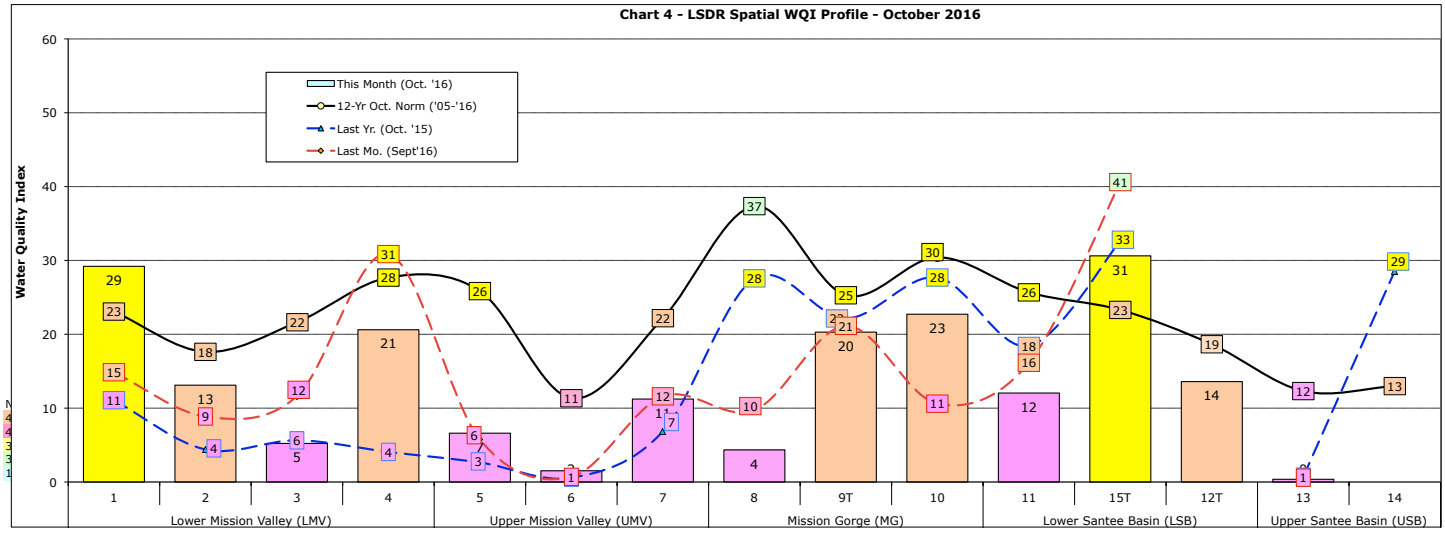


Chart 4 - LSDR Spatial WQI Profile - October 2016
Water Quality Index
This Month (Oct. '16)
12-Yr Oct. Norm ('05-'16)
Last Yr. (Oct. '15)
Last Mo. (Sept'16)
1 2 3 4 5 6 7 8 9T 10 11 15T 12T 13 14
Lower Mission Valley (LMV)
Upper Mission Valley (UMV)
Mission Gorge (MG)
Lower Santee Basin (LSB)
Upper Santee Basin (USB)

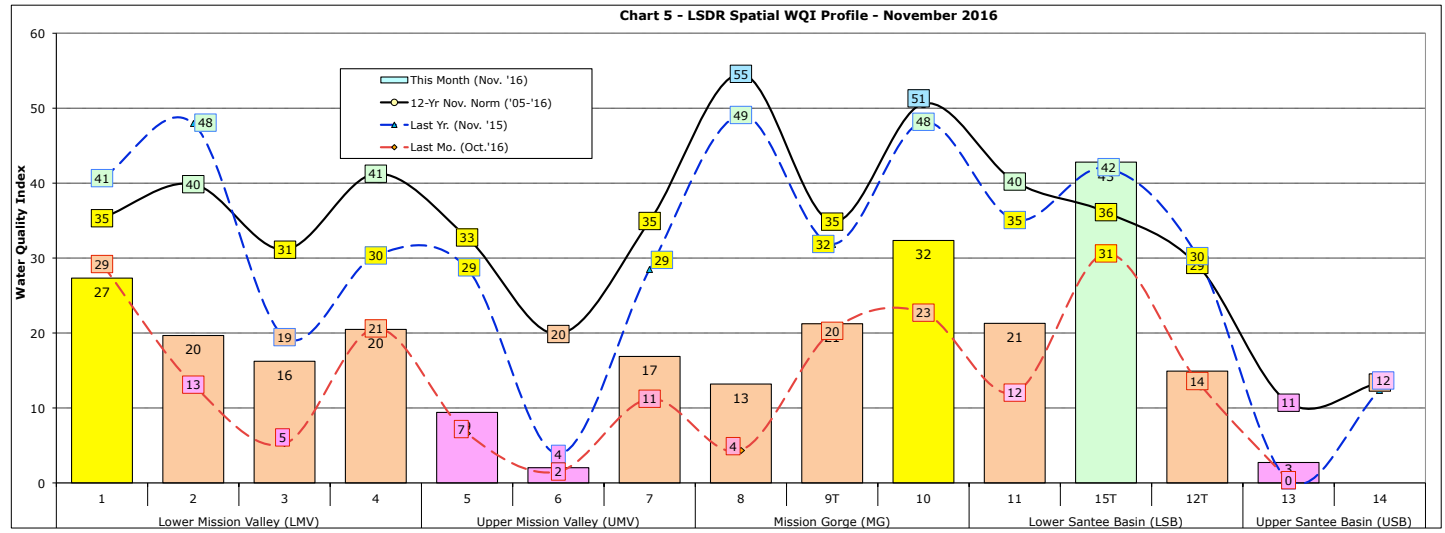


Chart 5 - LSDR Spatial WQI Profile - November 2016
Water Quality Index
This Month (Nov. '16)
12-Yr Nov. Norm ('05-'16)
Last Yr. (Nov. '15)
Last Mo. (Oct.'16)
1 2 3 4 5 6 7 8 9T 10 11 15T 12T 13 14
Lower Mission Valley (LMV)
Upper Mission Valley (UMV)
Mission Gorge (MG)
Lower Santee Basin (LSB)
Upper Santee Basin (USB)