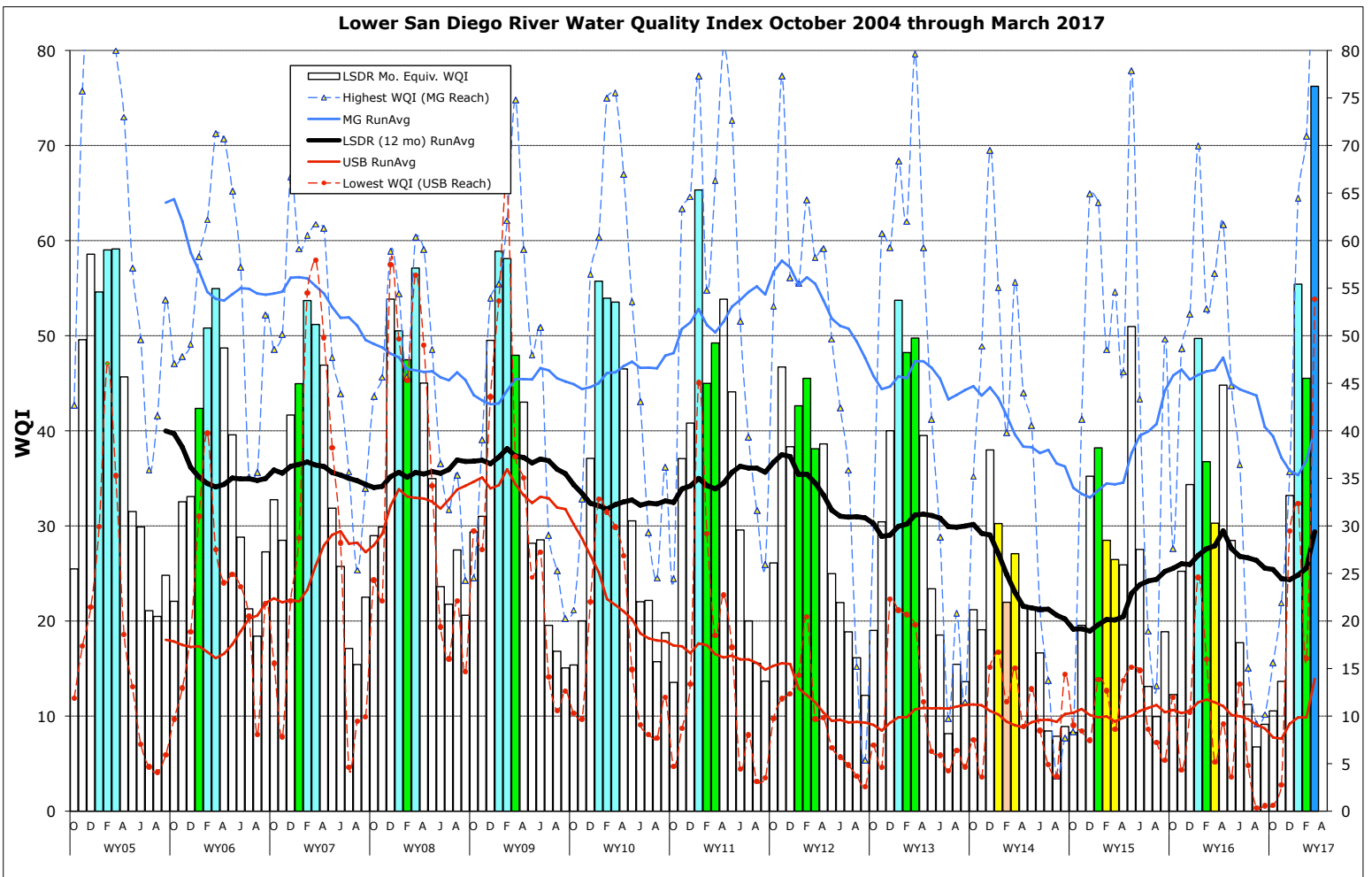


Monthly WQM Report

Lower San Diego River - March 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. December and January constitute the second and third month of winter/wet weather season. This month's index value is down eight points from last month, but eight points higher than last Feb. and one point above the 12-yr monthly norm. Overall water quality of the lower hydrologic unit (HSU 907.1) is rated Fair (C+).

Table 1 - March/February 2017 WQM Data Summary							
	West - MV	Mid - MG	East - SB	LSDR	Percent Variance from		
[Sites]	[1-7] Mar/Feb	[8-10] Mar/Feb	[11-15] Mar/Feb	[1-15] March/Feb	Last Mo (2/'17)	Last Yr (3/'16)	12-Yr Avg (Mar.)
Temperature, oC	19.6/14.7	16.7/14.7	18.5/15.3	18.6/14.9	24%	2%	11%
Sp.Cond., mS/cm	1.86/1.01	0.96/1.17	1.23/1.42	1.49/1.22	23%	-10%	-12%
DO, mg/L	9.89/7.57	11.9/9.43	7.89/5.58	9.53/7.04	40%	105%	50%
DO, % of Sat.	109/75	124/94	86/57	103/71			
pH	8.11/7.52	7.96/7.96	8.18/7.83	8.15/7.70	6%	12%	6%
30-day ADF, cfs	74/61	47/37	38/29	53/42	24%	222%	-45%
WQ Index	81/49	95/71	64/37	77/49	59%	126%	63%
Grade(Jan/Feb)	A/C+	A+/B	B/D+	A-/C+			
March 2017	Very Good	Very Good	Good	Very Good	WQI up 28 pts from last mo. Up 43 pts from last March.		

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

Overall, LSDR **water temperatures** are up 3.7 degrees Celsius (24%) from last month, nearly the same as last March and 11 percent above the 12-yr norm of 16.7°C. **Specific Conductivities** rose slightly (23%) from last month, but remain below last March by -10% and the 12-yr monthly norm (1.69 mS/cm) by -12%. **Dissolved oxygen** levels are up 40% from last month at 105% above last March and 50% above the 12-yr monthly norm of 6.56 mg/L. **Streamflow** over the antecedent 30-day period of 53 cfs is slightly higher than last month's 43 cfs value and, although twice the March 2016 level of 16 cfs, remains 45% below the 12-yr norm of 95 cfs. This month's LSDR **water quality index** (WQI) of 77(A-) rose 28 points (59%) from last month's value of 49(C), and 43 points above one year ago March (34) to 63% above the 12-yr monthly norm of 43 (C).

Conclusion:

The Lower San Diego River water quality index increased by 28 points, up 59% from **49 (C+Fair) to 77 (A-Very Good)** over the past month.

A summary of 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 (Mar. 2015 - Mar. 2017)							
	Mission Valley	Mission Gorge	Santee Basin	LSDR		ADF, cfs	MRF, in
March'15	24(E+)	55(B)	26(D-)	31(D)		15	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	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)		15	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	0.45
Jan.'16	54(B)	70(B)	42(C)	52(B)	WW	90	3.21
Feb.	40(C)	53(B)	35(D)	40(C)		8.9	0.05
March	32(D)	57(B)	25(D-)	34(D)		14	0.72
April	63(B)	62(B)	30(D)	49(C+)		12	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	0.4	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	1.3	0.07
Nov.	16 (E)	23(E)	14(E)	16(E)		5.9	0.61
Dec.	27(D)	36(D)	37(D+)	35(D)	WW	48	4.22
Jan. '17	62(B)	64(B)	49(C+)	57(B)	WW	167	3.01
Feb.	49(C+)	71(B)	37(D+)	49(C+)	WW	42	3.14
March'17	81(A)	95(A+)	64(B)	77(A-)	WW	53	0.05

The **cover page** chart presents monthly WQI values and their range (high-low) for the Lower San Diego River as determined over the past 12 and a half years of RiverWatch monitoring. January, February and March values for each of the last 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. The upward trend in the index through the past four months of winter is evident. This month's overall index of 77 (A-) is the highest overall LSDR value recorded since RiverWatch monitoring was started in October 2004. The previous high of 65 occurred in January 2011.

Monthly WQI values extending from Oct. 2004 through March 2017 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 **29** is just 7% below the 12-yr annual norm of 32. A year ago (March 2016) the running average WQI was one point lower (28) at 12% below the annual norm. Hydraulic flushing of the Upper Santee Basin portion of the river as well as the multiple downstream ponds has resulted in significantly improved dissolved oxygen levels over the past month.

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). Water quality has improved considerably at all sites over the past several months. Excessive growth of the invasive aquatic plant, floating primrose-willow (*Ludwigia hexapetala*) observed throughout many of the slower-moving reaches of the river that is considered a major contributor to dissolved oxygen deficits ($DO < 4.0$ mg/L) and resultant low WQI values during extended periods of prior years has been significantly reduced during recent record storm flow events.

Spatial WQI results by site 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) increased at all sites throughout the watershed in January. The index declined slightly at most sites in February, however, March presented a considerable increase above January's values at nearly all sites. Ten of the 15 sites are in the Very Good (A) range (WQI >75) this month while the remaining five lie in the Good (B) range (WQI 50-74).

Water quality index values can be expected to continue to remain reasonably high over the next month at most monitoring sites assuming little decline in dissolved oxygen levels and minor changes in Specific Conductivity, streamflow and water temperatures. Dissolved oxygen concentrations are anticipated to remain considerably above hypoxic limits (< 4 mg/L) until summer. Overall LSDR water quality is expected to remain 'Good' throughout the next several months assuming spring streamflows remain normal. Potential for some flooding of the river valley floor from an episodic storm event, should such occur over the next month or two, is always possible as upper groundwater aquifers are saturated.

jck (3/20/2017)

Chart 1 - LSDR WQI Trendlines by River Reach (Sept. 2005 thru March 2017)

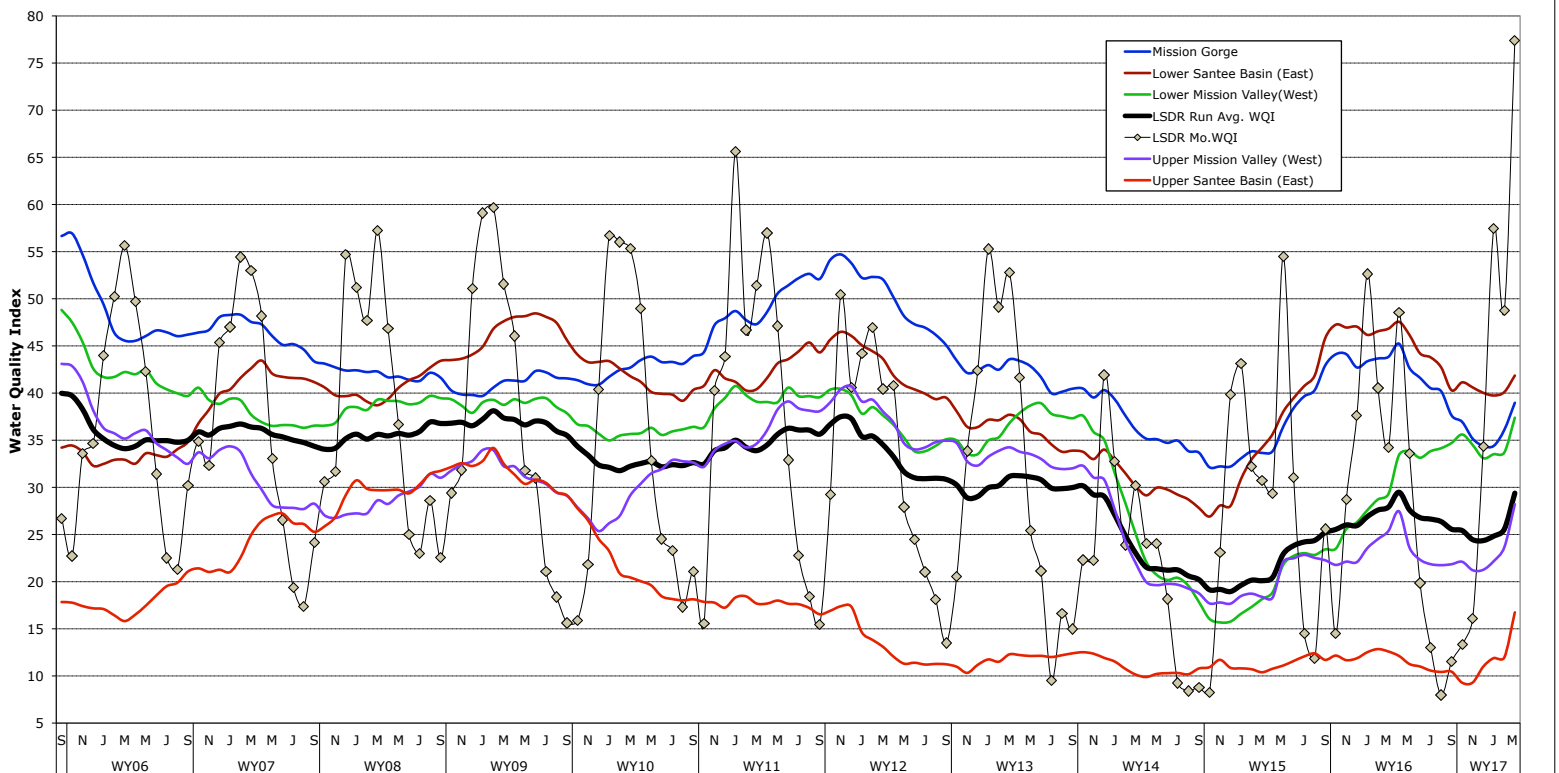


Chart 2 - Mast Park (Site 13) and Mission Gorge (Sites 8-10) Monthly and 12-mo Running Average WQI

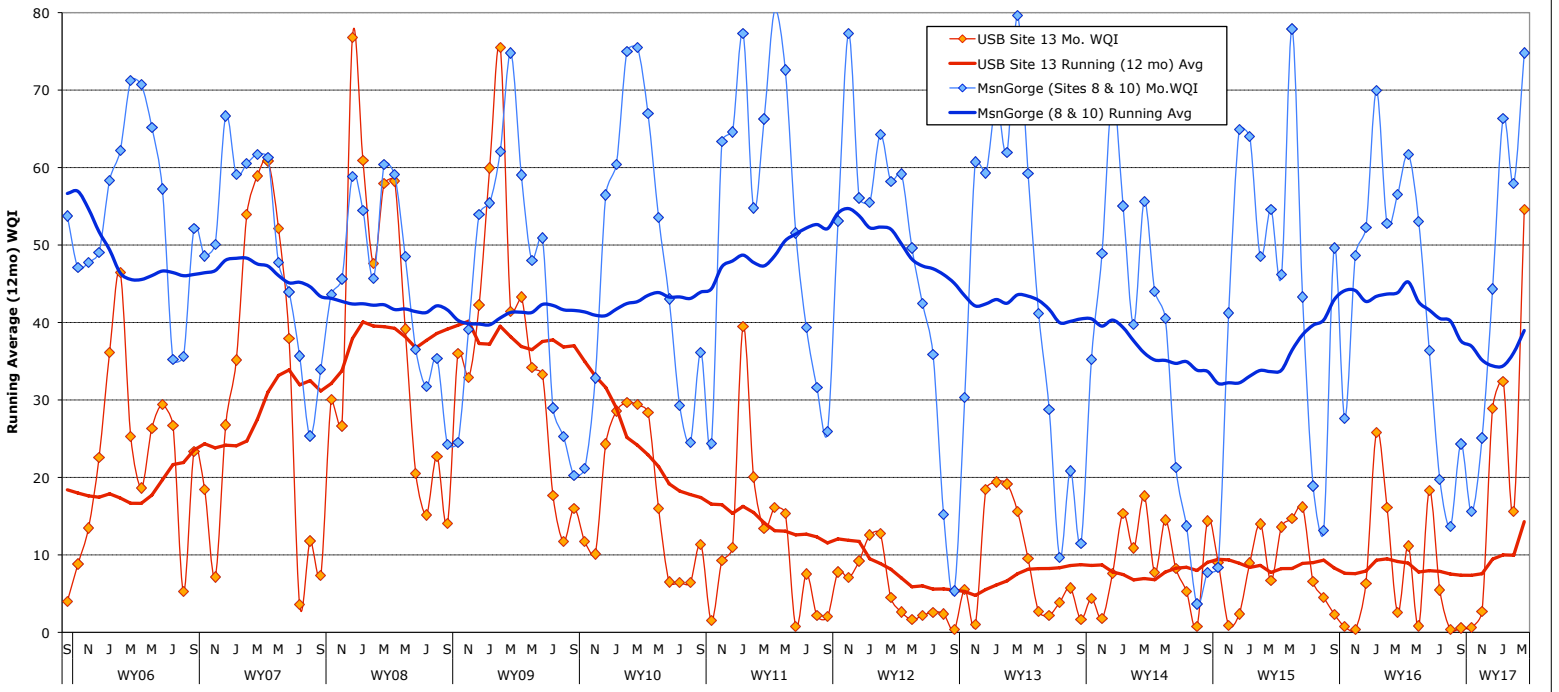


Chart 3 - LSDR Spatial WQI Profile - January 2017

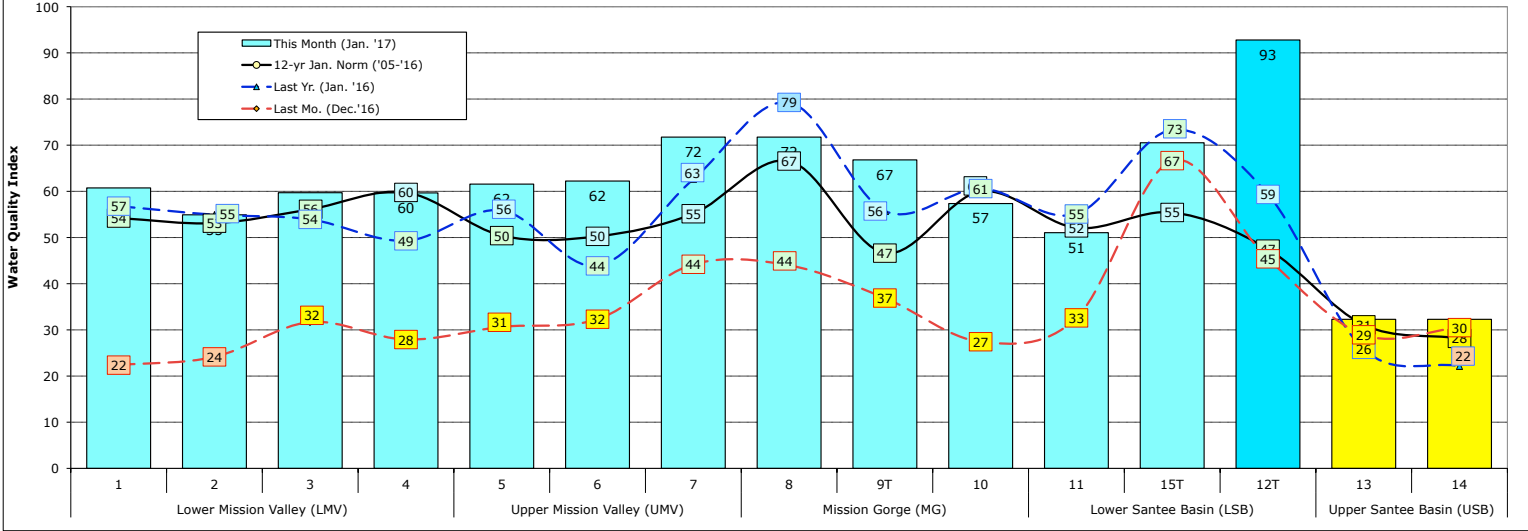


Chart 4 - LSDR Spatial WQI Profile - February 2017

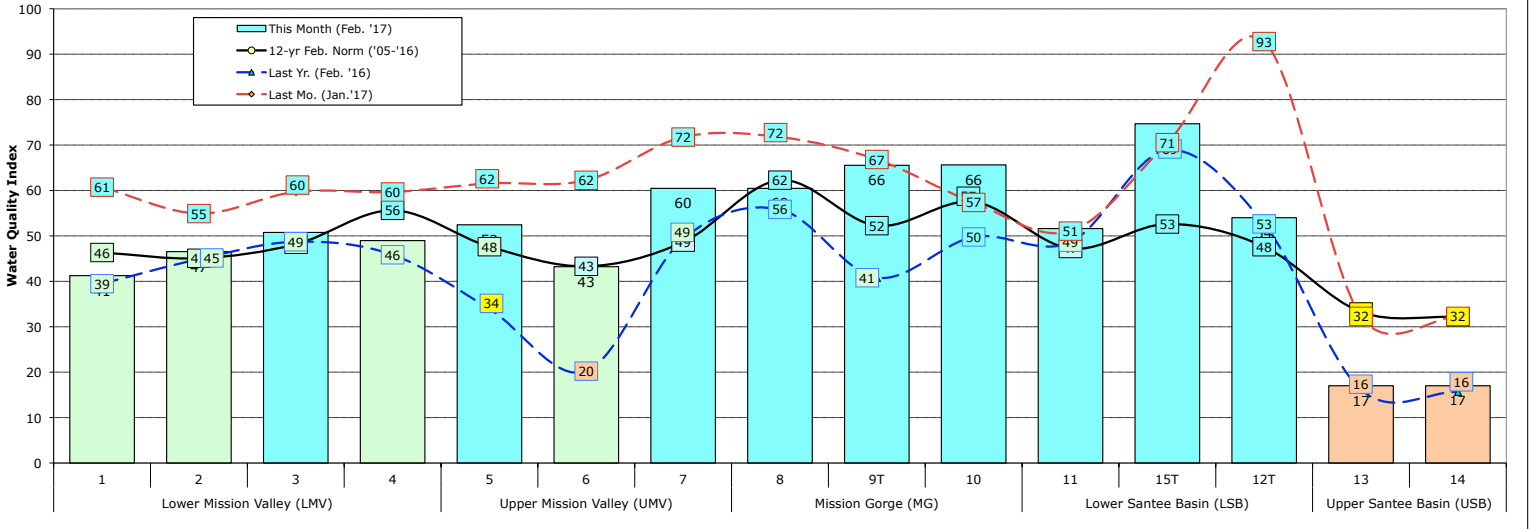


Chart 5 - LSDR Spatial WQI Profile - March 2017

