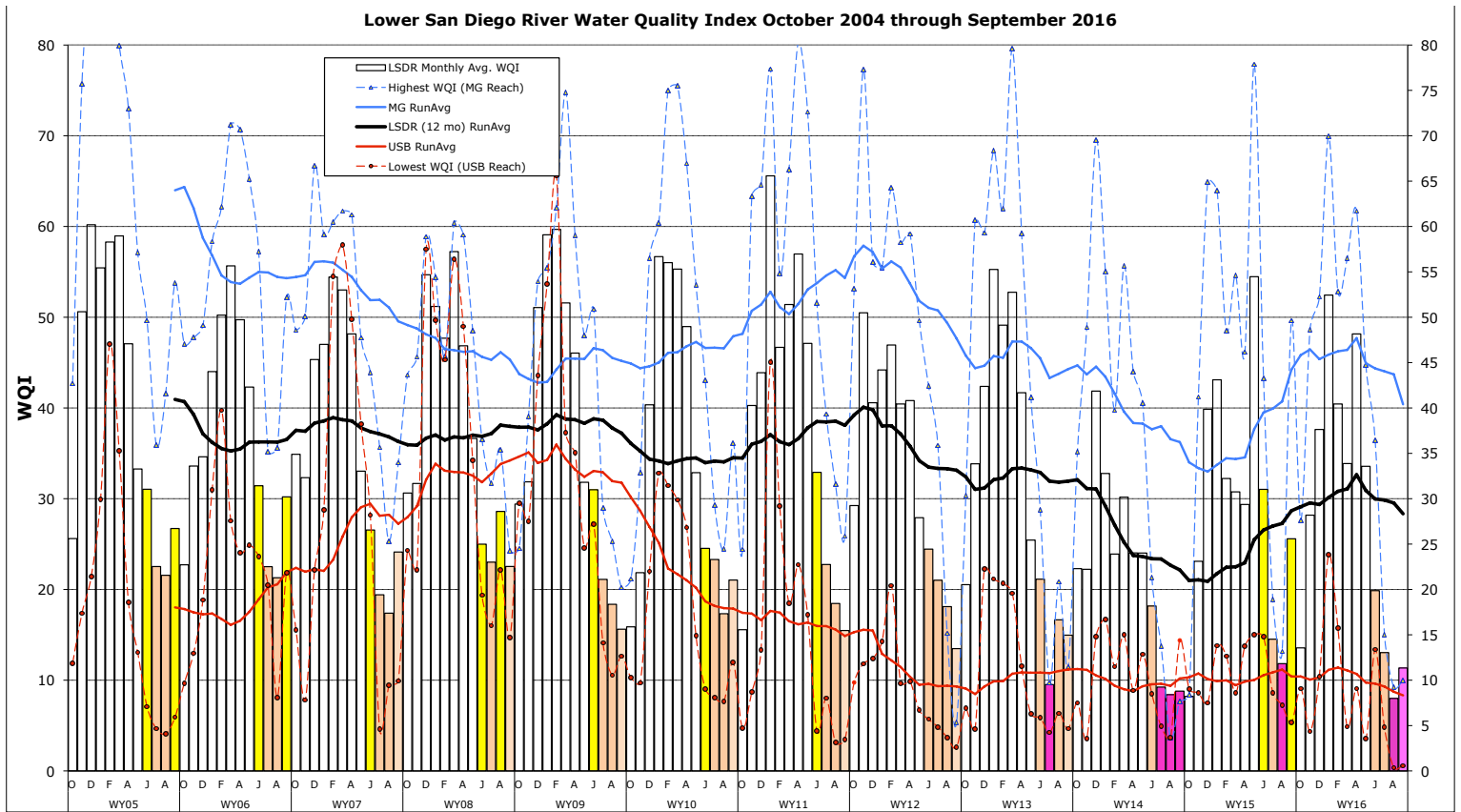


Monthly WQM Report

Lower San Diego River - September 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. August and September constitute the last two months of summer. This month's water quality index values are up slightly from last month, but much lower than last September and well below the 12-yr monthly norms for all five reaches of the river. General water quality of the lower hydrologic unit (HSU 907.1) remains Very Poor.

Table 1 - September/August 2016 WQM Data Summary							
	West - MV	Mid - MG	East - SB	LSDR	Percent Variance from		
[Sites]	[1-7] Sept/Aug	[8-10] Sept/Aug	[11-15] Sept/Aug	[1-15] Sept/August	Last Mo (8/2016)	Last Yr (9/2015)	12-Yr Avg (Sept.)
Temperature, oC	20.9/24.4	18.6/23.7	19.7/22.7	19.9/23.5	-15%	-15%	-7%
Sp.Cond., mS/cm	4.04/3.83	2.65/2.68	2.87/2.88	3.47/3.39	2%	125%	14%
DO, mg/L	2.57/2.53	3.80/3.60	3.92/3.17	3.11/2.71	10%	-6%	-18%
DO, % of Sat.	30/31	40/43	43/38	34/32			
pH	7.54/7.82	7.86/7.72	7.38/7.39	7.45/7.57	-2%	-3%	-3%
ADF, cfs	0.7/0.5	0.4/0.2	0.3/0.1	0.5/0.3	14%	-94%	-70%
WQ Index	12/10	10/9	12/6	11/8	42%	-56%	-41%
Grade(Sep/Aug)	F+/F	F/F	F+/F	F/F			
September 2016	VeryPoor	Very Poor	Very Poor	Very Poor	Up 3 pts from last mo.		

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

Overall, LSDR **water temperatures** are down 3.5 degrees Celsius (-15%) from last month and last Sept. at 1.5 degrees lower than the 12-yr September norm of 21.4° C. **Specific conductivities** have increased 2% from last month and are currently 125% above last Sept. and 14% higher than the 12-yr monthly norm. **Dissolved oxygen** levels are up 10% from last month, but 6% below last Sept. and 18% below the 12-yr monthly norm of 3.78 mg/L. **Streamflow** increased 14% from last month, but is still 94% below last September and 70% less than the 12-yr norm of 1.2 cfs. This month's LSDR **water quality index** (WQI) of 11(F) is up 3 points (42%) from last month's value of 8(F), but 56% less than a year ago and 41% below the 12-yr September norm of 19(E).

Conclusion:

The Lower San Diego River water quality index increased very slightly, moving from **8 (F Very Poor)** to **11 (F Very Poor)** over the last 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 (Sept. 2014 - Sept. 2016)							
	Mission Valley	Mission Gorge	Santee Basin	LSDR		ADF, cfs	MRF, in
Sept.'14	5(F)	8(F)	13(E-)	9(F)	DW	1.2	0.05
Oct	7(F)	8(F)	9(F)	8(F)	DW	0.4	0.01
Nov	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)	29(D)	15(E)	14(E)		4.3	0.42
Nov	27(D)	49(C+)	20(E)	28(D)		9.9	1.53
Dec.	40(C)	52(B)	29(D)	38(C-)		14.0	0.45
Jan.'16	54(B)	70(B)	42(C)	52(B)	WW	91.7	3.21
Feb.	40(C)	53(B)	35(D)	40(C)		9.6	0.05
March	32(D)	57(B)	25(D-)	34(D)		14.4	0.72
April	63(B)	62(B)	29(D)	48(C)		9.9	0.55
May	38(C)	45(C)	26(D-)	34(D)		6.4	0.43
June	14(E)	36(D)	18(E)	20(E)	DW	1.0	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. '16	12(F)	10(F)	12(F+)	11(F)	DW	0.4	0.00

WQI values are expected to improve at most monitoring sites over the next month with return of Autumnal conditions.

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 Summer months (June/July/August/September) values for each of the past 12 years are expressed as color-shaded bars. Running average index values for LSDR (for all 15 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's values are below those from last September but greater than monitored in 2014. The overall Summer WQI for WY16 of 13 is considerably below last summer's average (21) but still somewhat higher than the WY14 summer average (11), the lowest on record over the last 12 years.

Monthly WQI values extending from Oct. 2005 through September 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 LSDR). The current overall running average WQI for the LSDR of **29** is 15% below the 12-yr annual norm of 34. Although there were notable improvements in water quality for multiple reaches of the lower river watershed over the past winter, very poor water quality conditions have persisted all of this summer, most notably in the upper (eastern) reach of the Santee Basin segment, while conditions in the Mission Gorge and Mission Valley segments have also steadily 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 hexapetala*) observed throughout much of the slower-moving reaches of the river, are 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 90 gallons per minute (< 0.5 cfs) for much of September.

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 13 sites are in the Very Poor (8) or Poor (3) range this month. There is no flow at two sites (14-Cottonwood/RCP and 12T-Carlton Oaks/Santee Lakes). Forester Creek was monitored as Fair (WQI 41) while FSDRIP (Site 4) was Marginal (WQI 30).

Water quality index values can be expected to improve slightly over the next month at most monitoring sites assuming improved average daily flow, lowered water temperatures and somewhat higher dissolved oxygen levels. Dissolved oxygen values at many sites are likely to rise above hypoxic levels (< 4 mg/L) throughout the daylight hours. Several sites, however, are expected to remain in the anoxic with DO levels between < 2 mg/L. Overall, however, LSDR water quality is expected to improve.

jck (10/20/2016)

Chart 1 - LSDR WQI Trendlines by River Reach (Sept. 2005 thru Sept. 2016)

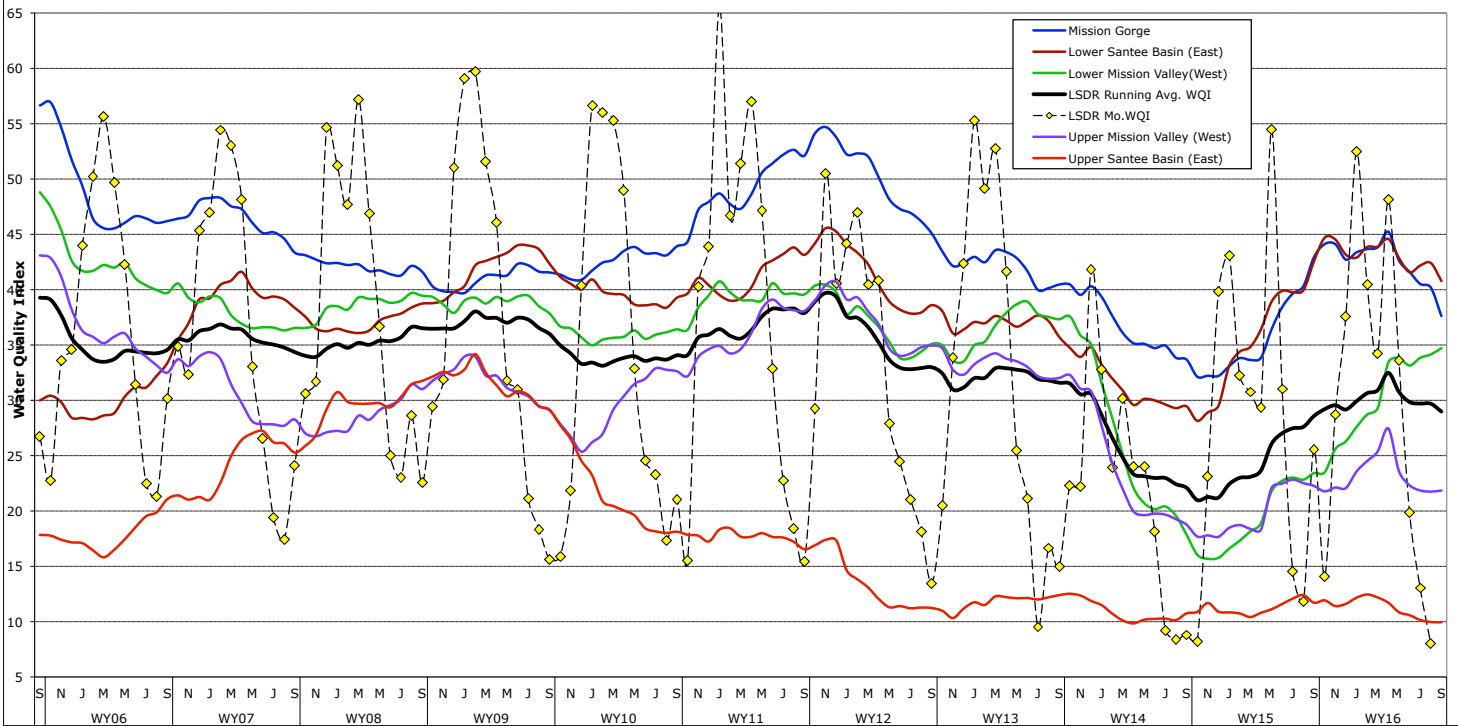


Chart 2 - Mast Park (Site 13) and Mission Gorge (Sites 8-10) Monthly and 12-mo Running Average WQI

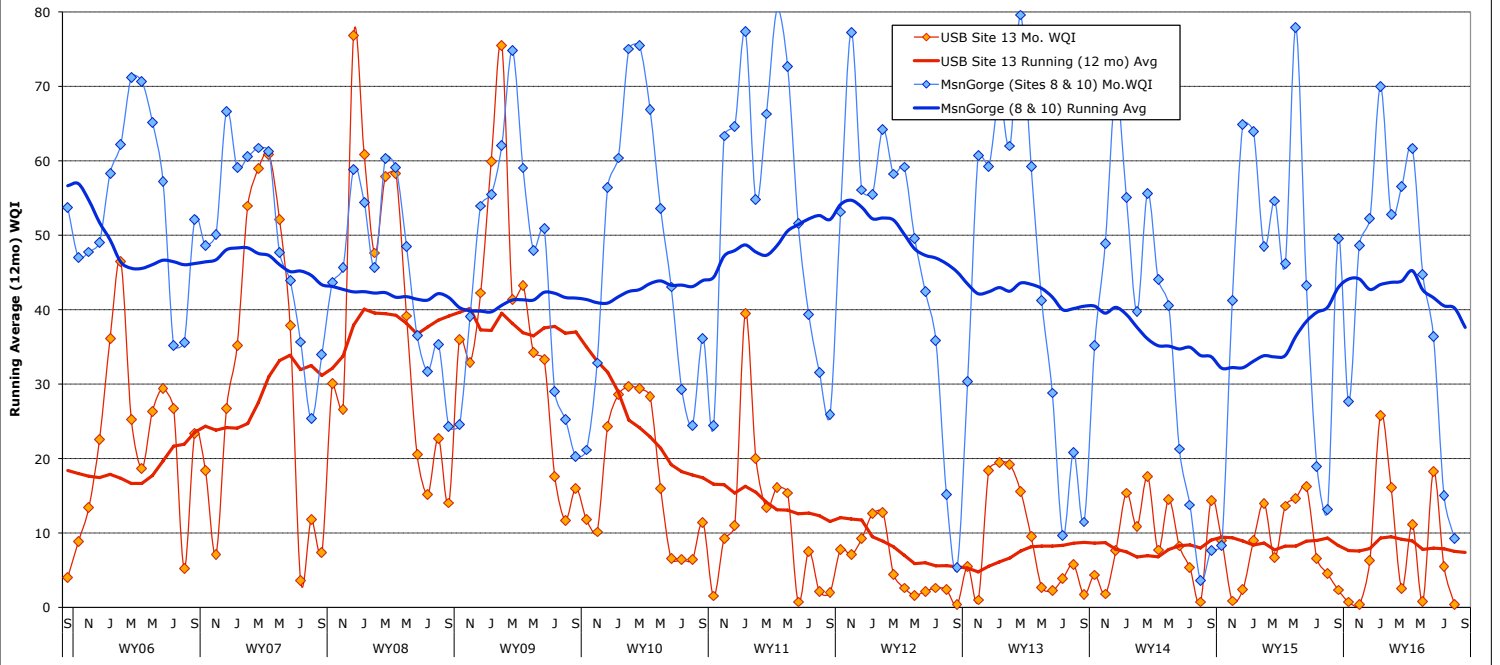


Chart 3 - LSDR Spatial WQI Profile - July 2016

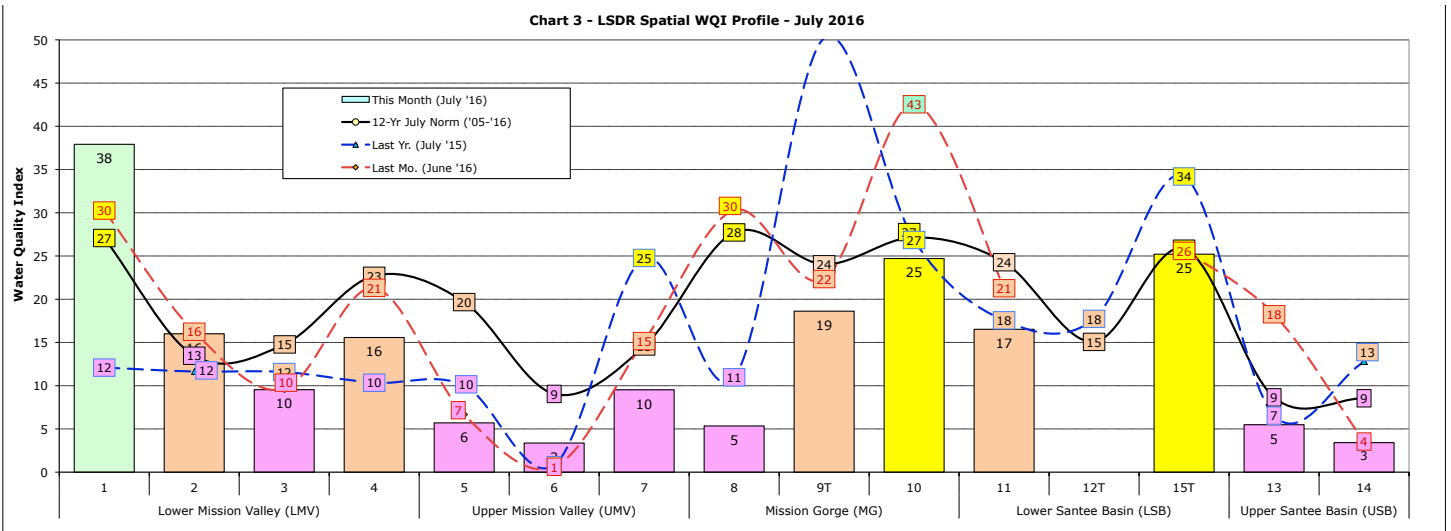


Chart 4 - LSDR Spatial WQI Profile - August 2016

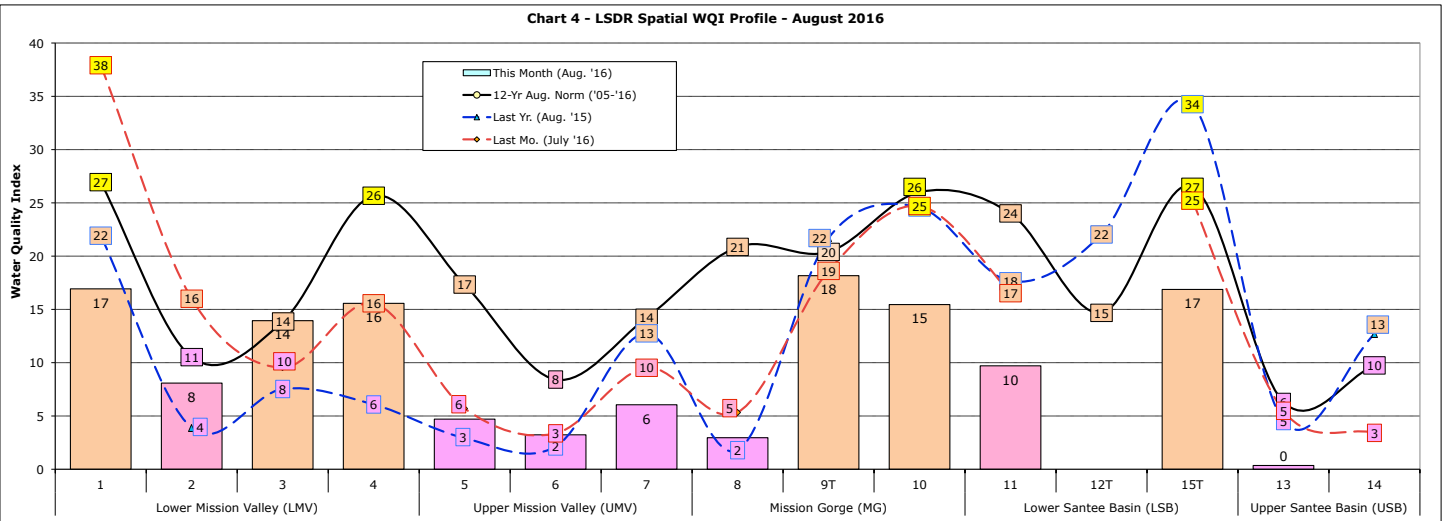


Chart 5 - LSDR Spatial WQI Profile - September 2016

