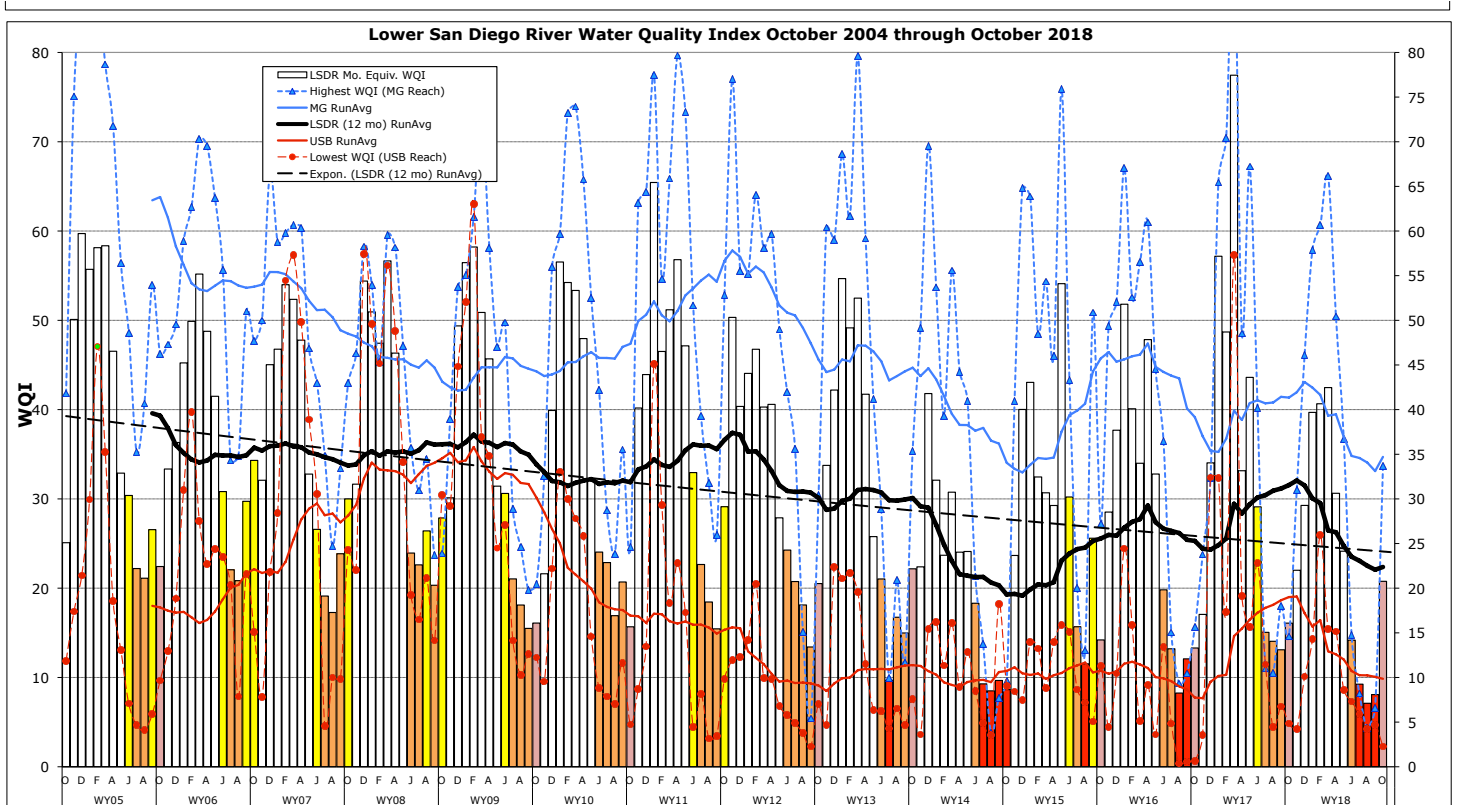


Monthly WQM Report

Lower San Diego River - October 2018



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 last two months (Sept./Aug) which constitute the last two months of summer. The September index rose one point (5%) from last month but has fallen four points from last year and nine points (-52%) below the 14-yr monthly average of 18. This month's overall water quality in the lower San Diego River hydrologic unit (HSU 907.1) is considered Very Poor (F).

Table 1 - September/October 2018 WQM Data Summary							
	West - MV	Mid - MG	East - SB	LSDR	Percent Variance from		
[Sites]	[1-7] Sept/Oct	[8-10] Sept/Oct	[11-15] Sept/Oct	[1-15] Sept/Oct	Last Mo (9-18)	Last Yr (10-17)	14-Yr Avg (Oct)
Temperature, oC	22.4/17.7	20.6/15.5	19.9/16.2	21.0/16.6	-20%	-14%	-12%
Sp.Cond., mS/cm	3.92/3.35	2.53/2.57	2.38/2.63	3.32/2.85	-14%	-11%	2%
DO, mg/L	2.22/3.55	2.84/4.71	3.06/2.35	2.56/3.23	20%	-2%	-20%
DO, % of Sat.	26/38	31/47	34/24	29/33			
pH	8.71/8.72	8.72/8.59	8.65/8.50	8.67/8.58	-1%	12%	12%
3-day ADF, cfs	0.26/1.4	0.03/0.9	0.02/0.8	0.09/1.0	990%	-26%	-26%
WQ Index	9/26	7/34	8/10	8/21	157%	29%	-2%
Grade(Jly/Aug)	F/D-	F/D	F/F	F/E			
Sept/ October '18	VeryPoor Marginal	VeryPoor Marginal	VeryPoor VeryPoor	VeryPoor Poor	Index up 13 points overall from last month		

DO values below a pre-hypoxic threshold of 4 mg/L (45 %Sat.) are expressed in red.

LSDR **water temperatures** fell 4.4°C (20%) from last month to 14% below last October and 2.2°C (12%) less than the 14-yr norm of 18.8°C. **Specific conductivity** of 2.85 mS/cm is 14% below last month's average, 11% less than last year's average and 2% more than the 14-yr norm of 2.80 mS/cm. The overall **dissolved oxygen** level of 3.23 mg/L (33%Sat.) is 20% greater than last month; but 2% below a year ago and 20% less than the 14-yr monthly norm of 4.03 mg/L (42%Sat). **Streamflow** over the antecedent 3-day monitoring period of 1.0 cfs is up 990% from last month to 26% less than a year ago and the 14-yr norm of 1.4 cfs. This month's LSDR **water quality index** (WQI) rose 13 points from last month to 21 (E/Poor) 157% above the September value and 29% above a year ago to within 2% of the 14-yr monthly norm of 21 (E/Poor).

Conclusion: The overall LSDR water quality index rose 13 points from **9 (F/Very Poor) to 21 (E/Poor)** over the past 30 day period.

A summary of monthly WQI values occurring over the past two years of record for the three sections of the lower San Diego River system and the overall LSDR average, are expressed in **Table 2** along with average daily 30-day antecedent flow (ADF) and total monthly rainfall (MRF).

Table 2 - WQI Values, Average Daily Flow and Monthly Rainfall (Oct. 2016 - Oct. 2018)							
	Mission Valley	Mission Gorge	Santee Basin	LSDR		ADF, cfs	MRF, in
Oct '16	13(E-)	16(E)	14(E-)	13(E-)	DW	1.1	0.07
Nov.	17(E)	24(E)	15(E-)	14(E)		1.3	0.61
Dec.	30(D)	35(D)	37(D+)	33(D)	WW	87	4.22
Jan. '17	61(B)	66(B)	49(C+)	56(B)	WW	105	3.01
Feb.	46(C)	70(B)	39(D+)	44(C)	WW	93	3.14
March	82(A)	95(A+)	64(B)	76(A-)	WW	23	0.07
April	31(D)	46(C)	29(D)	31(D)		6.3	0.02
May	43(C)	67(B)	33(D)	40(C)		6.9	0.92
June	22(E)	40(C)	31(D)	27(D-)		2.0	0.00
July	17(E)	10(F)	15(E-)	15(E-)	DW	1.0	0.00
Aug	18(E)	10(F)	12(F+)	14(E-)	DW	1.0	0.00
Sept	15(E)	11(F)	9(F)	12(F+)	DW	0.9	0.08
Oct.	20(E)	15(E)	14(E)	17(E)	DW	1.4	0.01
Nov.	25(D-)	31(D)	15(E)	22(E)		1.4	0.01
Dec.'17	26(D-)	46 (C)	25(D-)	30 (D)		2.3	0.02
Jan.'18	41(C)	58(B)	24(E+)	38(C)	WW	13	1.74
Feb.	41(C)	58(B)	35(D)	41(C)		4.4	0.02
March	42(C)	66(B)	31(D)	43(C)	WW	26	1.51
April	31 (D)	50 (B-)	22 (E)	31 (D)		2.4	0.30
May	24 (E+)	37 (D+)	18 (E)	24 (E+)		1.4	0.12
June	12 (F+)	15 (E)	16 (E)	14 (E)	DW	0.7	0.00
July	12 (F+)	8 (F)	8 (F)	9 (F)	DW	0.4	0.00
Aug	8 (F)	4 (F)	8 (F)	7 (F)	DW	0.3	0.02
Sept	9 (F)	7 (F)	8 (F)	8 (F)	DW	0.2	0.00
Oct '18	26 (D-)	34 (D)	10 (F)	21 (E)		3.6	0.57

The **cover page** chart presents monthly WQI values and their range (high-low) for the Lower San Diego River as determined over 14 years of RiverWatch monitoring. June-October values (most recent 5 months) for each year are expressed as color-shaded bars. Running average index values for LS DR (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 or poorest reach (Upper Santee Basin) are shown in red. A steep downward trend in the index in WY18 can be attributed to low oxygen levels in concert with well below normal seasonal flow. The overall trend of -2.5% per annum average decline since 2005 is expressed as a dashed black line.

Monthly WQI values extending from Oct. 2004 through Oct. 2018 are presented in **Chart 1** (next page) together with 12-mo. running average trendlines for each of the five principal reaches of the river and overall (i.e., for the lower SDR). The current running average WQI of 22 is 27% below the 14-yr LS DR norm of 31. In comparison, a year ago, the Oct. running average WQI was 32, two percent above the norm. The monthly low for October of 19 (37% below the norm) occurred in WY15. The overall LS DR downward trendline is shown dashed in black.

Monthly and 12-mo. running average WQI values for the poorest reach (Upper Santee Basin) and best (Mission Gorge section) are presented in **Chart 2** also on the next page. Although water quality improved to an extent in the Upper Santee Basin over the past year, resurgent growth and subsequent decay of invasive aquatic vegetation such as primrose-willow (*Ludwigia hexapetala*) in conjunction with low flows and large algal blooms are considered primary causes of deteriorated water quality both in the upper portion of the Santee Basin and the upper reach of Mission Valley. The steepest downward trend (red dashed line) is associated with the poorest reach (Upper Santee Basin) as evidenced by Site 13.

Spatial WQI results by site over the past three months of monitoring are shown in **Charts 3, 4 and 5** on page 6. The overall October index (color bars w/ index values in black) is up from last month with 2 sites Good(B); 2 more Fair(C) or Marginal(D) and the remaining ten Poor(E) or Very Poor(F). Last month all 13 sites (two were totally dry) were Very Poor (10) or Poor (3).L In July 100% of the sites were also Poor (4) or Very Poor (10). Extremely low rainfall throughout this past water year had a large impact on Lower San Diego River flow and resultant water quality.

In summary, the overall water quality index for the lower river watershed remains well below average perpetuating a downward trend expected to persist through the rest of this year. As shown on the cover page chart and in Charts 1 and 2, the running average WQI has declined since last Fall in all three sections of the lower river: Santee Basin, Mission Gorge and Mission Valley. The October index has been in the Poor (13-24) realm nine out of the past 14 years. The index was in the Very Poor (12 or less) range once (WY15) and four times in the Marginal range (25-37). The November index can often be several points higher than October due to further decline in water temperatures and higher dissolved oxygen levels.

JCK (10/22/18)

Chart 1 - LSDR WQI Trendlines by River Reach (Sept. 2005 thru Oct. 2018)

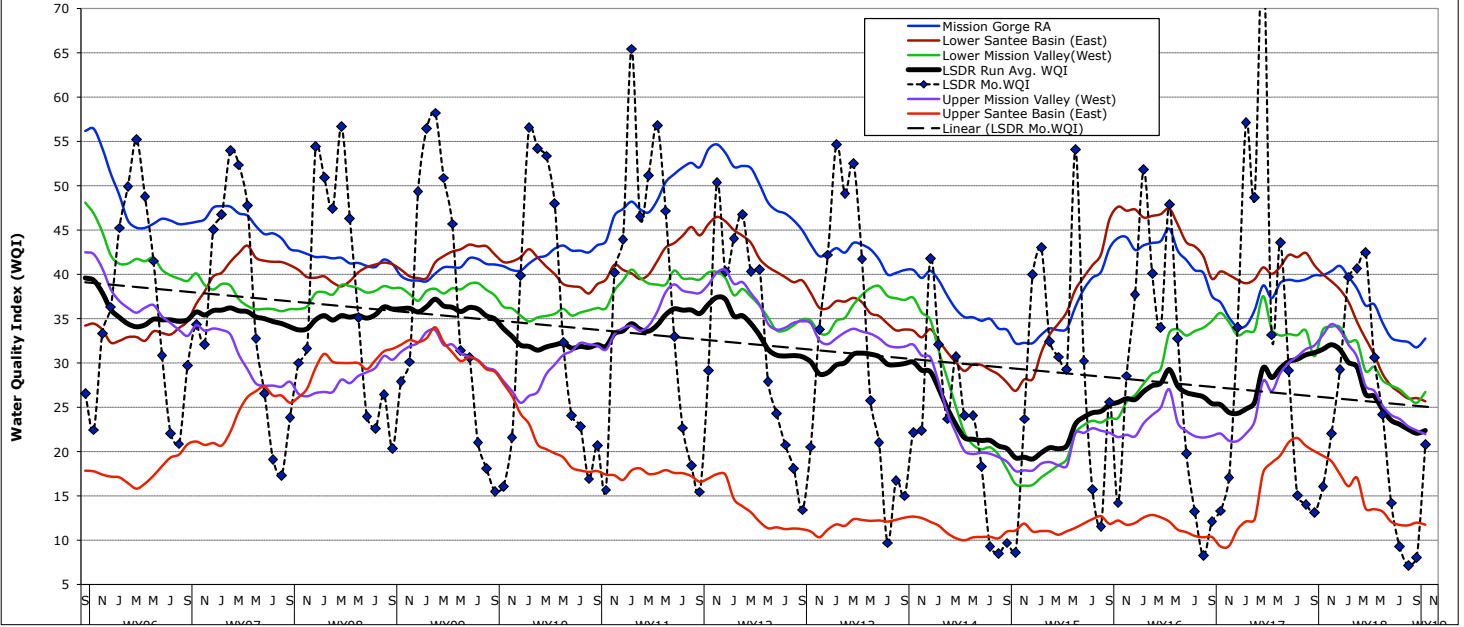


Chart 2 - Mast Park (Site 13) and Mission Gorge (Sites 8-10) Monthly and 12-mo Running Average WQI

