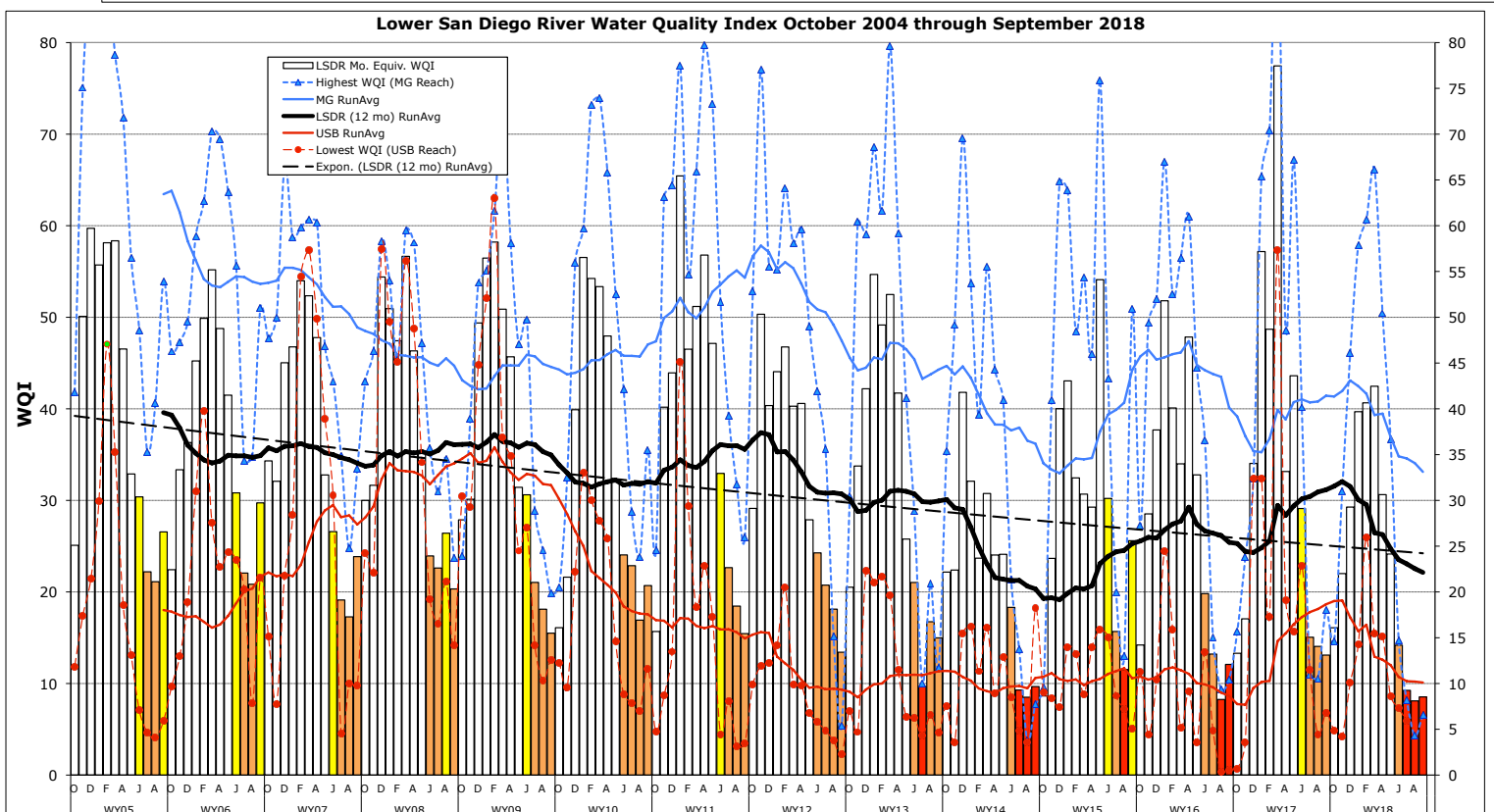


Monthly WQM Report

Lower San Diego River - September 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/August 2018 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/Aug	Last Mo (8-'18)	Last Yr (9-'17)	14-Yr Avg (Sept)
Temperature, oC	22.4/25.4	20.6/23.7	19.9/24.3	21.0/24.5	-14%	-7%	-2%
Sp.Cond., mS/cm	3.92/3.90	2.53/2.10	2.38/2.46	3.32/3.29	1%	9%	14%
DO, mg/L	2.22/2.43	2.84/3.74	3.06/3.05	2.56/2.94	-16%	-10%	-30%
DO, % of Sat.	26/30	31/44	34/37	29/36			
pH	8.71/7.70	8.72/8.02	8.65/7.91	8.67/7.81	11%	13%	13%
3-day ADF, cfs	0.26/0.12	0.03/0.03	0.02/0.01	0.09/0.06	60%	-88%	-92%
WQ Index	9/8	7/4	10/11	9/8	5%	-35%	-52%
Grade(Jly/Aug)	F/F	F/F	F/F	F/F			
September/ August '18	VeryPoor VeryPoor	VeryPoor VeryPoor	VeryPoor VeryPoor	PoorPoor VeryPoor	Index up 1 point overall from last month		

DO values below threshold limit of 4 mg/L (45 %Sat.) are expressed in red.

LSDR **water temperatures** dropped a significant 3.5°C (14%) from last month down to 7% below last September and a 0.5°C (-3%) less than the 14-yr monthly norm of 21.5°C. **Specific conductivity** of 3.32 mS/cm is only 1% higher than last month's average, 9% above last year's average and 14% greater than the 14-yr September norm of 2.91 mS/cm. The overall **dissolved oxygen** level of 2.56mg/L (29%Sat.) is 16% lower than last month; 10% below a year ago and 30% below the 14-yr monthly norm of 3.66 mg/L (41%Sat). **Streamflow** over the antecedent 3-day monitoring period of 0.09 cfs is down 60% from last month to 88% below a year ago and 92% less than the 14-yr norm of 1.5 cfs. This month's LSDR **water quality index** (WQI) of 9 (F/Very Poor) is one point (5%) higher than last month, but 35% below a year ago and 9 points under the 14-yr monthly norm of 18 (E/Poor).

Conclusion: The overall LSDR water quality index rose one point from **8 to 9** remaining F or Very 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 (Sept. 2016 - Sept. 2018)							
	Mission Valley	Mission Gorge	Santee Basin	LSDR		ADF, cfs	MRF, in
Sept '16	12(F+)	10(F)	12(F+)	12(F+)	DW	0.4	0.32
Oct	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.'16	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)	11 (F)	8 (F)	DW	0.3	0.02
Sept '18	9 (F)	7 (F)	10 (F)	9 (F)	DW	0.2	0.00

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-September values (four months of summer) for each year are expressed as color-shaded bars. Running average index values for LSDR (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 below normal seasonal flow caused by well below average rainfall. The overall 14-yr downward trend is expressed as a dashed black line.

Monthly WQI values extending from Oct. 2004 through Sept. 2018 are presented in **Chart 1** (next page) together with 12-mo. running averages (trend lines) 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 28% below the 14-yr LSDR norm of 31. In comparison, a year ago, the Sept. running average WQI was 31, one percent above the norm. The previous Sept. low of 20 (34% below norm) occurred in 2014.

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 for the past three months of monitoring are shown in **Charts 3, 4 and 5** on page 6. September WQI values (color bars w/index values in black) have declined at some sites from last month but improved at others. In mid-July 100% of the sites were Poor (4) or Very Poor (10). Last month 93% were Poor (3) or Very Poor (10) while one was Marginal. This month all 13 sites (two were totally dry) were Very Poor (10) or Poor (3). Extremely low rainfall throughout this water year has 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 has remain in single digits over the past month perpetuating a downward trend expected to persist through the rest of the year. As shown on the cover page chart and in Charts 1 and 2, the running average WQI has declined since last November in all three sections of the lower river: Santee Basin, Mission Gorge and Mission Valley. The September index has been in the Very Poor (12 or less) realm 3 out of past 5 years. The Sept. index has been in the Poor (13-24) range a total of nine times and in the Fair range (25-37) only once (WY08) since 2005. This year's dry-weather period (June-Sept.), although Very Poor overall, is not quite as bad as general water quality conditions experienced at many lower river monitoring sites in 2014. The November index is often a few points higher than the Septemrber index due to lower water temperatures and greater dissolved oxygen levels.

JCK (9/25/18)

