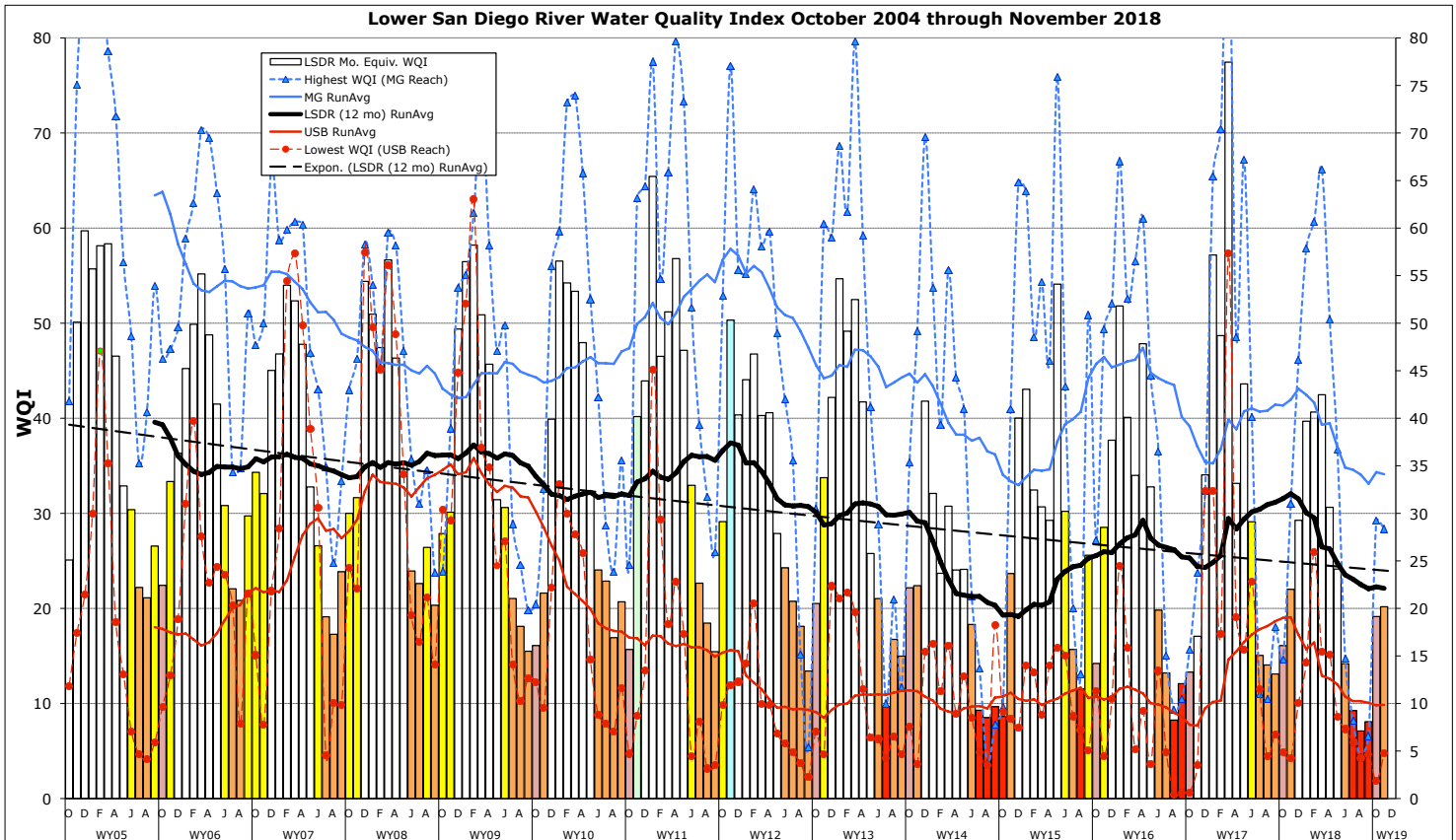


Monthly WQM Report

Lower San Diego River - November 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 (Nov/Oct) which constitute the two months of autumn. The November index rose one point (5%) from last month but is two points below last year and 11 points (-35%) below the 14-yr monthly average of 31. The overall water quality in the lower San Diego River hydrologic unit (HSU 907.1) for the month of November 2018 is considered Poor (F).

Table 1 - November/October 2018 WQM Data Summary							
	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-'18)	Last Yr (11-'17)	14-Yr Avg (Nov)
Temperature, oC	14.7/17.7	12.3/15.5	13.2/16.2	13.5/16.6	-18%	-17%	-9%
Sp.Cond., mS/cm	3.45/3.35	2.55/2.57	2.51/2.63	3.09/2.85	9%	-23%	18%
DO, mg/L	4.45/3.55	9.57/4.71	4.01/2.35	5.22/3.23	55%	22%	-4%
DO, % of Sat.	44/38	92/47	38/24	51/33			
pH	7.48/8.72	7.37/8.59	8.68/8.50	8.19/8.58	-5%	5%	6%
3-day ADF, cfs	1.0/1.4	0.6/0.5	0.5/0.4	0.7/0.7	-4%	-49%	-82%
WQ Index	23 /26	23 /29	14 /9	20 /19	5%	-8%	-35%
Grade(Nov/Oct)	E+/D-	D/D	E-/F	E/E			
November/ October '18	Poor/ Marginal	Marginal Marginal	Poor/ Very Poor	Poor/ Poor	Index up 1 point overall from last month		

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

LSDR **water temperatures** dropped 3.1°C (-18%) from last month to -17% below last November and 2.5°C (-9%) less than the 14-yr norm of 15.0°C. **Specific conductivity** of 3.09 mS/cm is 9% above last month's average and 18% above the 14-yr norm of 2.63 mS/cm, although well below (-23%) last year's Nov. average. The overall **dissolved oxygen** level of 5.22 mg/L (51% Sat) is up 55% greater than last month and 22% above a year ago, but -4% under the 14-yr monthly norm of 5.46 mg/L (53% Sat). **Streamflow** over the antecedent 3-day monitoring period of 1.0 cfs is down 4% from last month to 49% less than a year ago and 82% below the 14-yr norm of 4.0 cfs. This month's LSDR **water quality index** (WQI) rose one point from last month to 20 (E Poor) 5% above October but -8% less than a year ago and -35% below the 14-yr monthly norm of 31 (D Marginal).

Conclusion: The overall LSDR water quality index rose one point from **19 to 20 (E Poor)** over the past 30 days.

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 (Nov. 2016 - Nov. 2018)							
	Mission Valley	Mission Gorge	Santee Basin	LSDR		ADF, cfs	MRF, in
Nov.	17(E)	24(E)	15(E-)	17(E)		1.3	0.61
Dec.	30(D)	32(D)	38(D+)	34(D)	WW	87	4.22
Jan. '17	61(B)	65(B)	49(C+)	57(B)	WW	105	3.01
Feb.	46(C)	70(B)	38(C-)	49(C+)	WW	93	3.14
March	82(A)	94(A+)	64(B)	77(A-)	WW	23	0.07
April	31(D)	49(C)	28(D)	33(D)		6.3	0.02
May	43(C)	67(B)	32(D)	44(C)		6.9	0.92
June	22(E)	40(C)	31(D)	29(D)		2.0	0.00
July	17(E)	11(F)	15(E-)	15(E)	DW	1.0	0.00
Aug	18(E)	11(F)	12(F+)	14(E-)	DW	1.0	0.00
Sept	15(E)	18(E)	9(F)	13(E-)	DW	0.9	0.08
Oct.	20(E)	15(E)	13(E-)	16(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)	24(D-)	29(D)		2.3	0.02
Jan.'18	41(C)	58(B)	29(E+)	40(C)	WW	13	1.74
Feb.	41(C)	61(B)	31(D)	41(C)		4.4	0.02
March	42(C)	66(B)	31(D)	42(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	26(D-)	29(D)	9(F)	19(E)		3.5	0.57
Nov '18	23(E+)	28(D)	14(E-)	20(E)		1.0	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. October and November values (autumnal months) for each year are expressed as color-shaded bars together with the preceding summer months (June-September). 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/poorest reach (Upper Santee Basin) are shown in red. A steady downward slope in the index in WY18 can be attributed to low oxygen levels in concert with well below normal seasonal flows. The overall straight-line trend of -2.5% per annum average decline since the autumn of 2004 is expressed as a dashed black line.

Monthly WQI values extending from Oct. 2004 through Nov. 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 entire 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 Nov. running average WQI was 32, four percent above the norm. The monthly low for November of 19 (37% below the norm) occurred in WY15. The overall LSDR trendline, shown dashed in black, has declined by approximately ten index points (25%) over a 13 year period.

Monthly and 12-mo. running average WQI values for the poorest reach (Upper Santee Basin) and best (Mission Gorge) 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 the primrose-willow (*Ludwigia hexapetala*) in conjunction with low flows and extensive 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 sites 13 and 14.

Spatial WQI values by monitoring site over the past three months are shown in **Charts 3, 4 and 5** on page 6. The overall November index (color bars w/index values in black) is nearly the same as last month. However, this month 11 out of 15 sites were Poor(9) or Very Poor (2) while four were the Marginal(D). Last month ten out of 14 sites were Poor(6) or Very Poor(4) while the other four were Marginal(1), Fair(1) and Good(2). In September all 13 sites measured (two were totally dry) were Very Poor(10) or Poor(3). Extremely low rainfall throughout this past water year had a significant impact on Lower San Diego River flows and resultant water quality index values.

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 the calendar 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 November index has been in the Poor (13-24) realm seven out of the past 15 years, in the Marginal (25-37) range six times and twice in the Fair (38-49) range. The December index is usually higher than November due to further decline in water temperatures, greater daily flow from storm runoff and rising dissolved oxygen levels.

JCK (11/19/18)

