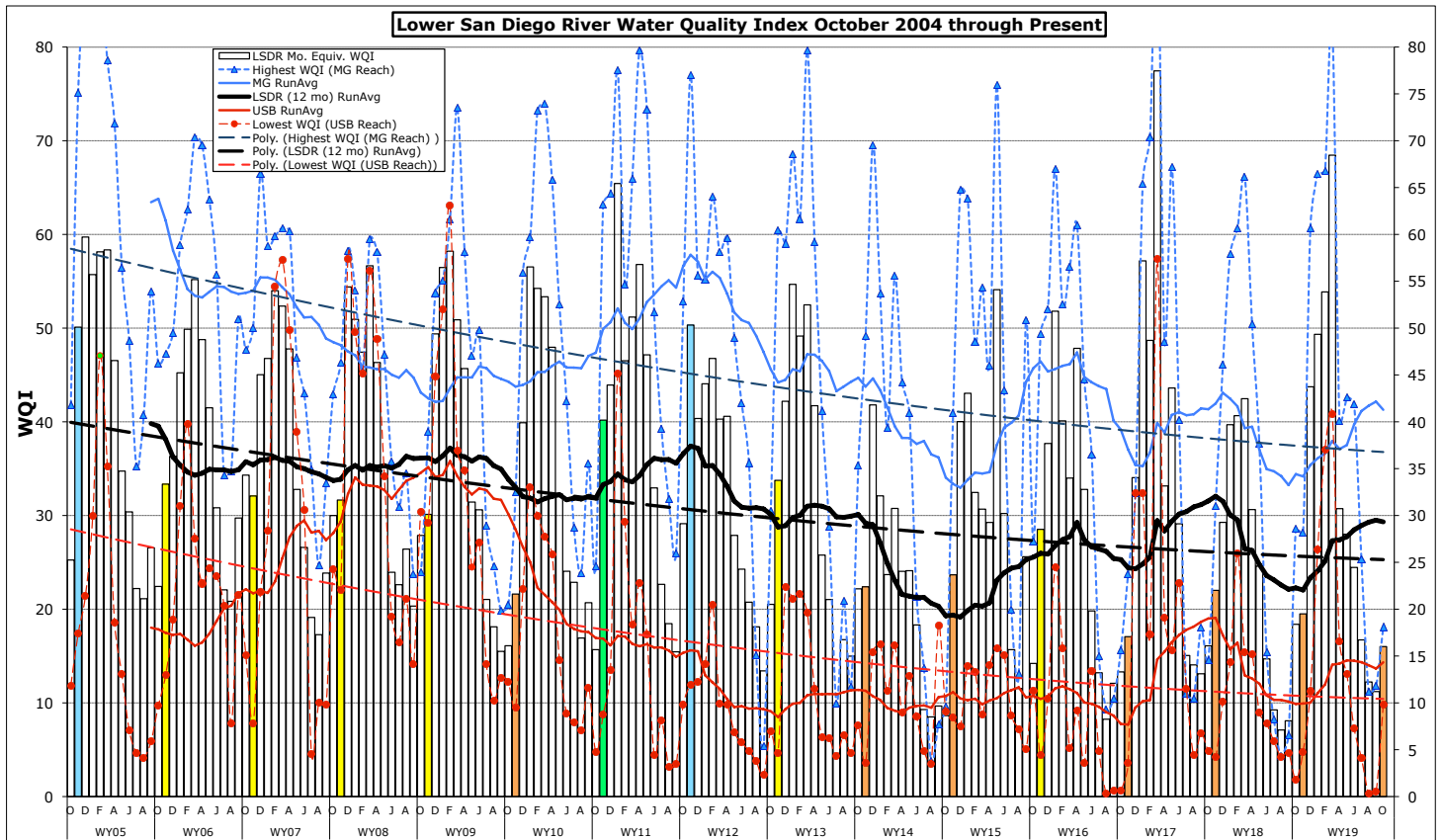


Monthly WQM Report

Lower San Diego River - October 2019



Lower SDRWQ Monitoring Data Summary

Table 1 presents a summary of water quality data monitored by the SDRPF RiverWatch Team within the Lower San Diego River watershed over the past two months (Sept/Oct), constituting the last month of summer and the first month of fall. The October index rose five points (43%) from last month to within four points of the 15-yr monthly average of 20. Overall water quality in the lower San Diego River hydrologic unit (HSU 907.1) for October is rated as F Poor.

Table 1 - September/October 2019 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 (9'19)	Last Yr (10'18)	15-Yr Avg (0CT)
Temperature, oC	22.5/19.8	19.1/16.6	20.4/18.9	20.9/18.7	-10%	13%	0%
Sp.Cond., mS/cm	3.67/3.65	2.39/2.39	2.62/2.36	3.14/3.02	-4%	6%	7%
DO, mg/L	2.16/2.86	2.76/4.92	2.01/2.43	2.18/3.56	63%	13%	-10%
DO, % of Sat.	25/31	30/51	18/37	24/38			
pH	7.67/7.62	7.85/7.75	7.59/7.64	7.61/7.52	0%	-11%	-1%
3-day ADF, cfs	1.8/1.4	0.7/0.7	0.6/0.7	1.0/0.9	-8%	59%	-46%
WQ Index	15/17	12/18	8/15	11/16	43%	-13%	-19%
Grade Sept/Oct	E/E	F+/E-	F/E	F/E			
September/ October 2019	Poor/ Poor	VeryPoor/ Poor	VeryPoor Poor	VeryPoor Poor	Index rose 5 points overall from last month		

Negative variance (declines from norms) and DO depletion (< 5.0 mg/L) expressed in red.

LSDR **water temperatures** dropped one and a half degrees (-10%) from last month to the 15-yr norm of 18.7 oC. The overall **specific conductivity** of 3.02 mS/cm constitutes a 4% decrease from last month, but 6% above a year ago and 7% above the 15-yr norm of 2.83 mS/cm. The overall **dissolved oxygen** level of 3.56 mg/L (38%Sat.) is 63 percent higher than last month and 12% above a year ago Oct. closing to within 10% of the 15-yr monthly norm of 3.98 mg/L (42%Sat). **Streamflow** over the antecedent 3-day period of 0.9 cfs is down 8% from last month at 46% less than the 15-yr norm. This month's LSDR **water quality index** (WQI) increased five points (43%) from last month, to within two points of last yr and just four points (-19%) below the 15-yr Oct. norm of 20.

Monthly WQI values occurring over the past 26 months of record for the three main sections of the lower San Diego River system and the overall LSDR average, along with average 30-day antecedent flow (ADF) and monthly rainfall (MRF), are expressed in **Table 2** on the next page.

Table 2 - WQI Values, Average Daily Flow and Monthly Rainfall (7/2017 - 9/2019)							
	Mission Valley	Mission Gorge	Santee Basin	LSDR		ADF, cfs	MRf, in
Aug. 17	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)	t	1.4	0.01
Dec.	26(D-)	46 (C)	24(D-)	29 (D)	t	2.3	0.02
Jan.'18	41(C)	58(B)	29(E+)	40(C)	WW	13	1.78
Feb.	41(C)	61(B)	31(D)	41(C)	t	4.4	0.36
Mar.	42(C)	66(B)	31(D)	42(C)	WW	22	0.95
April	31 (D)	50 (B-)	22 (E)	31 (D)	t	2.8	0.02
May	24 (E+)	37 (D+)	18 (E)	24 (E+)	t	2.3	0.12
June	12 (F+)	15 (E)	17 (E)	15 (E)	DW	1.3	0.00
July	12 (F+)	8 (F)	8 (F)	9 (F)	DW	0.7	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	0.3	0.00
Oct	24 (D-)	29 (D)	9 (F)	18 (E)	t	3.2	0.57
Nov	21 (E+)	28 (D)	14 (E-)	19 (E)	t	9.6	0.81
Dec.	54 (B)	61 (B)	25 (D-)	44 (C)	WW	48	3.02
Jan.'19	47 (C)	66 (B)	43 (C)	49 (C+)	WW	39	2.80
Feb.	51 (B)	67 (B)	51 (B-)	54 (B)	WW	179	2.98
Mar.	76 (A-)	82 (A)	55 (B)	68 (B)	WW	25	1.28
April	33 (D)	40 (C)	24 (E+)	31 (D)	t	8.6	0.46
May	28 (D)	43 (C)	21 (E)	28 (D)	t	14.3	0.51
June	21 (E)	42 (C)	20 (E)	24 (E+)	t	4.3	0.38
July	17 (E)	25 (D-)	13 (E-)	17 (E)	DW	1.2	0.01
Aug.	16 (E)	11 (F)	9 (F)	12 (F+)	DW	0.9	0.02
Sept	15 (E)	12 (F+)	8 (F)	11 (F+)	DW	1.2	0.03
Oct '19	17 (E)	18 (E-)	15 (E)	16 (E)	DW	1.0	0.01

The **cover page** chart presents monthly WQI values and their range (high-low) for the Lower San Diego River as determined over the past 15 years of RiverWatch monitoring. The past four-month values (July-Oct.) for each year are expressed as color-shaded bars; yellow are D-Marginal (25-37), brown E-Poor (13-24) and pink F-Very Poor (0-12). Running average index values for LSDR (flow-weighted average of 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 generally downward slope in index over the 15 year period is attributed to declining oxygen levels extending throughout protracted low-flow/dry weather periods. The dashed black line represents an overall (straight-line) trend of -2.5% per annum decline in the index since late 2004. WY05 presented best overall water quality during the past 15 years of monitoring while the poorest water quality was experienced during the summer months of WY14 extending through October, 2014.

Monthly WQI values extending from Oct. 2004 through Oct. 2019 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., lower SDR). The current running average WQI of 29 is five percent below the 15-yr LSDR flow-weighted average index of 31, at seven index points above a year ago. The monthly low for Oct. of 19 (-37% below the norm) occurred in 2014. The highest running average WQI for Oct. of 40 (+29% above norm) occurred in 2006. The overall LSDR running average (12-month trendline), shown dashed in black, has fallen 11 index points (-27%) over the span of 15 years.

Monthly and 12-mo. running average WQI values for the poorest reach (Upper Santee Basin) and best (Mission Gorge) are presented in **Chart 2**. Although water quality improved within the Upper Santee Basin over the past year, resurgent growth and subsequent decay of such invasives as floating primrose-willow (*Ludwigia peploides*) in conjunction with low flow and increased biomass are primary causes of deteriorated water quality both within this reach and deeper portions of Mission Valley (Kaiser Ponds). The greatest downward trend (red dashed line) is associated with the poorest reach (Upper Santee Basin) encompassing monitoring sites 13 (Mast Park) and 14 (Magnolia/RCP).

Spatial WQI values by monitoring site over the past three months are shown in **Charts 3, 4 and 5** on page 6. The October results (color bars w/values in black) are higher than monitored last month and in August. In September, seven out of 14 sites were Very Poor(F), whereas this month only three sites out of 15 were F (<12). Less oxygen depletion from decomposition, lower water temperatures and greater streamflow, are the primary drivers of improved water quality.

The overall October index shows an improvement in water quality over last month due to higher dissolved oxygen concentrations monitored in all reaches of the lower river system. This month's index also shows that the lower river system has improved from the same time last year although remaining below the 15-year Oct. average. November is typically a month of even more noticeable improvement in LSDR water quality.

(jck 11/4/2019)

