

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 (Nov/Dec); the last two months of the calendar year. The December index rose 27 points (133%) from last month to eight points above the 15-yr monthly average of 40. Overall water quality in the lower San Diego River hydrologic unit (HSU 907.1) for December rose two grades from Poor (E) to Fair (C+).

Table 1 - November/December 2019 WQM Data Summary							
	West - MV	Mid - MG	East - SB	LSDR	Percent Variance from		
[Sites]	[1-7] Nov/Dec	[8-10] Nov/Dec	[11-15] Nov/Dec	[1-15] Nov/Dec	Last Mo (11'19)	Last Yr (12'18)	15-Yr Avg (Dec.)
Temperature, oC	16.9/12.0	15.2/8.8	15.9/11.0	16.1/10.9	-32%	-19%	-9%
Sp.Cond., mS/cm	3.78/1.94	2.50/1.38	2.47/1.77	3.09/1.88	-39%	-5%	4%
DO, mg/L	2.56/9.42	5.35/8.97	3.44/5.86	3.76/7.76	96%	20%	18%
DO, % of Sat.	37/87	52/89	35/52	38/72			
pH	7.50/7.75	7.76/8.02	7.52/7.68	7.51/7.71	3%	2%	0%
3-day ADF, cfs	1.4/12.5	0.9/10.1	0.9/9.8	1.1/10.8	100%	42%	-60%
WQ Index	19/59	39/60	14/31	21/48	133%	10%	20%
Grade Nov/Dec	E/B	C/B	E/D	E/C			
November/ December 2019	Poor/ Good	Fair/ Good	Poor/ Marginal	Poor/ Fair	Index rose 27 points overall from last month		

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

LSDR **water temperatures** dropped over five degrees (-32%) from last month to 9% below the 15-yr norm (12 oC). Overall **specific conductivity** of 1.88 mS/cm constitutes a 39% decline from last month, to within four percent of the 15-yr norm of 1.88 mS/cm. The overall **dissolved oxygen** level of 7.76 mg/L (72%Sat.) is 96% greater than last month, 20% above a year ago, and 18% higher than the 15-yr monthly norm of 6.65 mg/L (61%Sat). **Streamflow** over the antecedent 3-day period of 10.8 cfs is 100% greater than last month, 42% more than a year ago but below the 15-yr norm of 26 cfs. This month's LSDR **water quality index** (WQI) increased 27 points (133%) from last month, to four points (10%) above last yr and eight points (20%) greater than the 15-yr Dec. norm of 40.

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 (10/2017 - 12/2019)							
	Mission Valley	Mission Gorge	Santee Basin	LSDR		ADF, cfs	MRF, in
Oct. '17	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. '17	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. '18	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	17 (E)	18 (E-)	15 (E)	16 (E)	DW	1.0	0.00
Nov.	19 (E)	38 (C)	14 (E)	21 (E)	DW	1.2	0.52
Dec. '19	59 (B)	60 (B)	31 (D)	48 (C)	WW	10.8	3.51

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 two-month values (Dec. & Nov.) for each year are expressed as color-shaded bars; blue B (50 or >) Good, green C (38-49) Fair, yellow D (25-37) Marginal, brown E (13-24) Poor and pink F-(12 or <) Very Poor. 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 trend of -2.5% per annum decline in index value since late 2004. WY05 presented best overall water quality during the past 15 years while the poorest water quality was experienced during the summer months of WY14 extending through October.

Monthly WQI values extending from Oct. 2004 through Dec. of this year are presented in **Chart 1** (next page) together with 12-mo. running averages for each of the five principal reaches of the river and overall (i.e., LSDR). The current running average WQI of 30 is only four percent below the 15-yr LSDR flow-weighted average index of 30.5, remaining six index points above a year ago. The Dec. low of 19 (-38% below the norm) occurred in 2014. The highest running average WQI for Dec. of 37 (+16% above norm) occurred in 2006. The overall LSDR running average (12-month trendline), shown dashed in black, has declined 10 index points 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 Ave/RCP).

Spatial WQI values by monitoring site over the past three months are shown in **Charts 3, 4 and 5** on page 6. The December results (color bars w/values in black) are much higher than monitored both last month and in October. In October, 93% of the sites (11 of 15) were Poor or Very Poor, whereas this month only two (13%) were in the lowest two grades. Ten of 15 sites (67%) were found Good (WQI >50) this month whereas none were both last month and in October.

The overall December index shows significant improvement in water quality over last month due to higher dissolved oxygen concentrations, lower water temperatures and reduced conductivity. This month's index shows that the lower river system improved considerably from the same time last year to exceed the 15-year Dec. average. December is typically a month of significant improvement in LSDR water quality as illustrated on the cover page chart. The primary driver is increased streamflow (discharge and flushing) resulting from greater rainfall.

(jck 12/23/2019)



