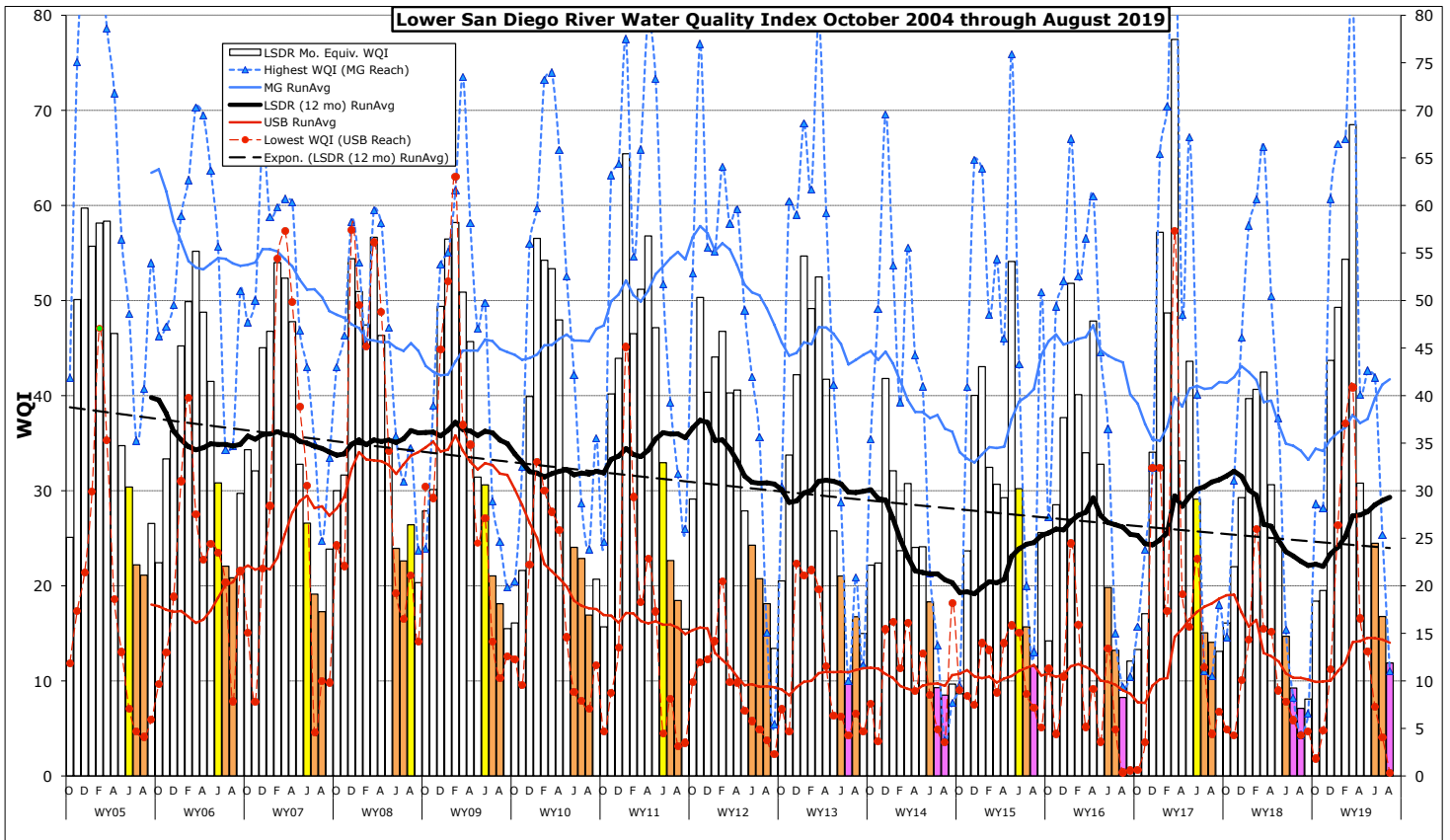


Monthly WQM Report

Lower San Diego River - August 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 (July/Aug) which constitute mid-summer. The August index fell five points (-29%) from last month to two points below the 15-yr monthly average of 14. Overall water quality in the lower San Diego River hydrologic unit (HSU 907.1) for this month is categorized as Very Poor (F+).

| Table 1 - July/August 2019 WQM Data Summary | | | | | | | |
|--|-------------------|-----------------------|---------------------|--------------------|--|-------------------|--------------------|
| | West - MV | Mid - MG | East - SB | LSDR | Percent Variance from | | |
| [Sites] | [1-7] July/Aug | [8-10] July/Aug | [11-15] July/Aug | [1-15] July/Aug | Last Mo (7'19) | Last Yr (8'18) | 15-Yr Avg (Aug) |
| Temperature, oC | 24.0/23.6 | 22.3/22.0 | 22.6/21.8 | 23.0/22.5 | -2% | -9% | -3% |
| Sp.Cond., mS/cm | 3.14/3.50 | 2.09/2.32 | 2.40/2.61 | 2.71/2.99 | 10% | -9% | 2% |
| DO, mg/L | 2.61/2.42 | 6.38/4.70 | 2.77/2.59 | 3.39/2.72 | -20% | -10% | -21% |
| DO, % of Sat. | 31/29 | 73/55 | 32/30 | 40/32 | | | |
| pH | 7.70/7.65 | 7.88/7.57 | 7.83/7.44 | 7.77/7.51 | -3% | -4% | -2% |
| 3-day ADF, cfs | 1.2/1.0 | 0.9/0.6 | 0.9/0.5 | 1.0/0.7 | -29% | 1136% | -63% |
| WQ Index | 17/16 | 25/11 | 13/9 | 17/12 | -29% | 67% | -16% |
| Grade July/Aug | E/E | D-/F | E-/F | E/F+ | | | |
| July/ August 2019 | Poor/ Poor | Marginal/ VeryPoor | Poor/ VeryPoor | Poor/ VeryPoor | Index fell 5 points overall from last month | | |

Negative variance (declines from norms) and DO deficits (< 4.0 mg/L) expressed in red.

LSDR **water temperatures** dropped a half degree (-2%) from last month (9% less than last Aug.) to 3% below the 15-yr norm of 23.3 oC. The overall **specific conductivity** of 2.99 mS/cm constitutes a 10% increase from last month, remaining 9% below a year ago but 2% above the 15-yr norm of 2.94 mS/cm. The overall **dissolved oxygen** level of 2.72 mg/L (32% Sat.) is 20 percent below last month and the 15-yr monthly norm of 3.49 mg/L. **Streamflow** over the antecedent 3-day period of 0.7 cfs is down 29% from last month but is still ten times a year ago at -63% under the 15-yr norm. This month's LSDR **water quality index** (WQI) fell five points (-29%) from last month to a value 67% above last, remaining two points (-16%) below the 15-yr Aug. norm of 14.

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 (6/2017 - 8/2019) | | | | | | | |
|--|----------------|---------------|--------------|---------|----|----------|---------|
| | Mission Valley | Mission Gorge | Santee Basin | LSDR | | ADF, cfs | MRf, in |
| June '17 | 21(E) | 40 (C) | 31 (D) | | | | |
| July | 17 (E) | 11 (F) | 15 (E) | | | | |
| 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 | 1.78 |
| Feb. | 41(C) | 61(B) | 31(D) | 41(C) | | 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) | | 2.8 | 0.02 |
| May | 24 (E+) | 37 (D+) | 18 (E) | 24 (E+) | | 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. '18 | 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) | | 3.2 | 0.57 |
| Nov | 21 (E+) | 28 (D) | 14 (E-) | 19 (E) | | 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) | | 8.6 | 0.46 |
| May | 28 (D) | 43 (C) | 21 (E) | 28 (D) | | 14.3 | 0.51 |
| June | 21 (E) | 42 (C) | 20 (E) | 24 (E+) | | 4.3 | 0.38 |
| July | 17 (E) | 25 (D-) | 13 (E-) | 17 (E) | DW | 1.4 | 0.01 |
| Aug.'19 | 16 (E) | 11 (F) | 9 (F) | 12 (F+) | DW | 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 the past 15 years of RiverWatch monitoring. The past three month values (June, July & Aug.) for each year are expressed as color-shaded bar columns; 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 dry-weather periods of low flow. 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 monitored during the past 15 years of monitoring while the poorest water quality was experienced during the latter months of WY14 extending into early WY15.

Monthly WQI values extending from Oct. 2004 through August 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 5% below the 15-yr LSDR flow weighted average of 31, while six index points greater than a year ago. The monthly low for Aug. of 21 (33% below the norm) occurred in 2014. The highest running average WQI for Aug. of 36 (17% above norm) occurred in 2011. The overall LSDR trendline, shown dashed in black, has fallen by approximately 15 index points (25%) over the span of 15 years. As in previous water years, monthly WQI values decrease during the dry-weather portion of the year.

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 invasives such as primrose-willow (*Ludwigia hexapetala*) in conjunction with low flow and accretion of muck are primary causes of deteriorated water quality both within this reach and deeper portions of Mission Valley (Kaiser Ponds). The steepest 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 August results (color bars w/values in black) are lower than monitored in June and July. Last month, 11 out of 14 sites (79% of total) were Poor(E) or Very Poor(F) grades, whereas this month 12 out of 13 sites (92%) are Poor or Very Poor while the remaining site is Marginal. Dissolved oxygen depletion from algal and benthic demands constitute the primary drivers of the mid-to-late summer decline in water quality.

The August index has continued to decline due to depleted dissolved oxygen levels monitored throughout all reaches of the river combined with minimal streamflow. This month's index indicates the lower river system is likely to experience well below normal dry-weather water quality in most reaches throughout September.

(jck 9/24)

