**Supplementary** **Table 1** Values of the measured bacteriological, physical and chemical water quality parameters in each sampling campaign in both rivers. Zmean: mean depth, Zmax: maximum depth, TDS: total dissolved solids, N-NH3: ammoniacal nitrogen, SRP: soluble reactive phosphorus, DO: dissolved oxygen, COD: chemical oxygen demand, CDOM ag254: chromophoric dissolved organic matter at 254 nm. MSI: chromophoric organic matter molecular size index, TC: total coliforms, FC: faecal coliforms. n=48 for physical and chemical variables and n=16 for microbiological variables in each river. nd: no data available.

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|  | Rojas River | | | | | | | | | | | | | | | |
| R1 | | | | R2 | | | | R3 | | | | R4 | | | |
| M | J | S | D | M | J | S | D | M | J | S | D | M | J | S | D |
| Zmean (m) | 0.94 | 0.50 | 0.43 | 0.35 | 1.41 | 0.98 | 1.17 | 0.95 | 0.90 | 1.32 | 1.43 | 1.18 | nd | 1.53 | 1.45 | 1.34 |
| Zmax(m) | 1.04 | 0.75 | 0.90 | 0.77 | 2.14 | 1.95 | 2.18 | 1.70 | 0.94 | 1.67 | 1.95 | 1.40 | nd | 1.97 | 1.88 | 1.50 |
| Temperature (°C) | 24.03  ±0.12 | 12.06  ±0 | 14.07  ±0.06 | 23.73  ±0.25 | 23.70  ±0 | 13.27  ±0.12 | 13.73  ±0.06 | 24.63  ±0.25 | 23.70  ±0.17 | 12.37  ±0.06 | 13.93  ±0.06 | 24.50  ±0.10 | 23.63  ±0.15 | 12.33  ±0.06 | 14.30  ±0.10 | 24.27  ±0.21 |
| Conductivity (μS cm-1) | 7356.67  ±5.77 | 5766.67  ±11.55 | 6653.33  ±25.17 | 6206.67  ±72.34 | 6453.33  ±15.28 | 5273.33  ±20.82 | 5866.67  ±15.28 | 5726.66  ±75.06 | 6453.33  ±5.77 | 5470.00  ±10 | 6320  ±10.00 | 6103.33  ±15.28 | 6523.33  ±15.28 | 5220  ±34.64 | 6336.67  ±25.17 | 5800  ±62.45 |
| pH | 8.65  ±0.02 | 8.13  ±0 | 8.21  ±0.01 | 8.31  ±0.02 | 8.44  ±0.39 | 8.12  ±0.01 | 8.14  ±0.01 | 8.30  ±0.03 | 8.52  ±0.02 | 8.17  ±0.01 | 8.16  ±0.01 | 8.22  ±0.02 | 8.91  ±0.01 | 8.11  ±0.01 | 8.11  ±0.01 | 8.32  ±0.03 |
| Turbidity (NTU) | 32.33  ±1.10 | 29.15  ±0.27 | 44.11  ±0.96 | 32.92  ±3.60 | 27.02  ±0.39 | 32.82  ±2.24 | 38.10  ±1.82 | 22.30  ±0.58 | 20.97  ±0.63 | 26.63  ±0.55 | 28.75  ±0.55 | 12.00  ±0.16 | 50.25  ±3.51 | 25.80  ±0.21 | 27.90  ±0.61 | 23.49  ±0.46 |
| Secchi depth (cm) | 24.00  ±2.64 | 26.00  ±0 | 18.50  ±0.50 | 15.00  ±0 | 20.00  ±2.00 | 29.00  ±0 | 21.00  ±0 | 21.33  ±2.31 | 29.67  ±0.58 | 28.33  ±0.58 | 30.50  ±0.50 | 25.67  ±1.15 | 19.67  ±0.58 | 25.67  ±0.58 | 28.00  ±0 | 24.50  ±0.50 |
| TDS (mg L-1) | 3.69  ±0.01 | 2.88  ±0.01 | 3.33  ±0.02 | 3.10  ±0.04 | 3.23  ±0.01 | 2.63  ±0.01 | 2.63  ±0.01 | 2.93  ±0.01 | 3.22  ±0 | 2.73  ±0.01 | 3.15  ±0.01 | 3.05  ±0.01 | 3.26  ±0.01 | 2.61  ±0.02 | 3.17  ±0.02 | 2.89  ±0.03 |
| N-NH3 (mg L-1) | 0.15  ±0.11 | 0.17  ±0.05 | 0.22  ±0.01 | 0.02  ±0.02 | 2.26  ±0.69 | 2.95  ±0.07 | 1.52  ±0.02 | 2.19  ±0.22 | 2.24  ±0.51 | 0.40  ±0.03 | 0.57  ±0.01 | 1.67  ±0.08 | 0.03  ±0.02 | 0.44  ±0.04 | 0.49  ±0.01 | 0.02  ±0.03 |
| SRP (mg L-1) | 0.04  ±0.01 | 0.50  ±0.03 | 0.32  ±0.02 | 0.13  ±0.02 | 0.21  ±0.08 | 0.65  ±0.01 | 0.41  ±0.03 | 0.41  ±0.01 | 0.05  ±0.01 | 0.44  ±0.01 | 0.33  ±0.03 | 0.36  ±0.02 | 0.01  ±0 | 0.43  ±0 | 0.33  ±0.01 | 0.19  ±0.02 |
| Sulphates (mg L-1) | 822.59  ±204.01 | 480.17  ±16.53 | 783.20  ±4.77 | 2218.83  ±19.27 | 778.51  ±184.06 | 394.77  ±29.02 | 631.68  ±67.31 | 2166.36  ±115.77 | 447.93  ±165.29 | 425.07  ±26.57 | 810.74  ±103.55 | 2209.57  ±65.03 | 624.24  ±182.82 | 375.48  ±31.29 | 728.10  ±54.19 | 2181.79  ±53.46 |
| Chlorides (mg L-1) | 1354.32  ±9.88 | 1015.43  ±5.76 | 1188.74  ±0 | 1396.59  ±18.83 | 1190.45  ±41.16 | 895.57  ±2.03 | 1010.07  ±3.06 | 1244.16  ±12.77 | 1142.97  ±3.48 | 952.42  ±2.69 | 1101.47  ±2.70 | 1372.41  ±2.55 | 1179.45  ±1.74 | 897.92  ±2.03 | 1100.29  ±3.06 | 1272.17  ±2.55 |
| DO (mg L-1) | 5.99  ±0.14 | 8.90  ±0.04 | 8.39  ±0.07 | 8.13  ±0.20 | 9.01  ±0.27 | 8.82  ±0.06 | 7.65  ±0.12 | 8.97  ±0.18 | 2.96  ±0.02 | 8.85  ±0.03 | 6.61  ±0.01 | 3.03  ±0.12 | 8.58  ±0.14 | 8.30  ±0.09 | 7.08  ±0.05 | 8.87  ±0.48 |
| COD (mg L-1) | 158.33  ±83.29 | 88.67  ±10.26 | 89.00  ±10.15 | 68.32  ±2.34 | 111.00  ±10.15 | 96.33  ±11.02 | 78.33  ±8.33 | 64.90  ±4.57 | 112.00  ±12.12 | 85.33  ±7.23 | 77.33  ±13.58 | 56.41  ±3.64 | 140.33  ±7.57 | 77.00  ±6.08 | 69.33  ±8.33 | 56.78  ±2.11 |
| CDOM ag254 (nm-1) | 54.32  ±0.45 | 97.34  ±2.53 | 42.53  ±0.27 | 57.58  ±0 | 55.07  ±0.65 | 93.74  ±4.80 | 45.62  ±0.59 | 59.62  ±0.80 | 54.69  ±0.35 | 105.02  ±0.40 | 42.91  ±0.93 | 58.11  ±0.53 | 60.17  ±0.95 | 99.96  ±1.52 | 42.38  ±0.40 | 64.71  ±0.69 |
| Water colour ag440 (nm-1) | 2.57  ±0.16 | 4.99  ±0.13 | 2.23  ±0.27 | 2.38  ±0.13 | 2.74  ±0.37 | 5.15  ±1.54 | 2.82  ±0.32 | 3.25  ±0.27 | 2.82  ±0.13 | 6.06  ±0.13 | 1.84  ±0.23 | 2.92  ±0.13 | 3.45  ±0.37 | 5.90  ±0.26 | 2.30  ±0.23 | 3.15  ±0.27 |
| MSI ag250/a365 | 6.20  ±0.10 | 5.44  ±0.02 | 5.60  ±0.21 | 6.32  ±0.18 | 5.99  ±0.23 | 5.23  ±0.44 | 5.33  ±0.20 | 5.67  ±0.09 | 5.77  ±0.10 | 5.22  ±0.06 | 5.83  ±0.21 | 5.90  ±0.22 | 5.78  ±0.25 | 5.18  ±0.13 | 5.77  ±0.03 | 6.02  ±0.08 |
| Chlorophyll-a (μg L-1) | 58.06  ±14.50 | 27.68  ±1.36 | 236.86  ±5.10 | 109.23  ±6.56 | 107.41  ±3.32 | 25.40  ±1.26 | 51.53  ±4.40 | 74.03  ±2.18 | 174.42  ±5.64 | 21.05  ±4.76 | 36.65  ±0.63 | 115.03  ±1.66 | 302.88  ±19.71 | 29.03  ±2.62 | 51.17  ±2.88 | 156.71  ±7.06 |
| TC (MPN/100 mL) | 40 | 1700 | 300 | 2400 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 230 | 16000 | 16000 | 2200 |
| FC (MPN/100 mL) | 0 | 80 | 40 | 220 | 1300 | 16000 | 16000 | 16000 | 60 | 9000 | 16000 | 16000 | 0 | 9000 | 3000 | 110 |
| *E. coli* (MPN/100 mL) | 0 | 40 | 40 | 60 | 170 | 70 | 800 | 60 | 60 | 170 | 340 | 30 | 0 | 60 | 340 | 90 |
| *E. coli* (copy number/100 mL) | 105 | 183 | 62 | 40 | 90001 | 42824 | 12533 | 50310 | 2731 | 492 | 1052 | 1804 | 18.53 | 2200 | 3511 | nd |

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|  | Salado River | | | | | | | | | | | | | | | |
| S1 | | | | S2 | | | | S3 | | | | S4 | | | |
| M | J | S | D | M | J | S | D | M | J | S | D | M | J | S | D |
| Zmean (m) | 0.80 | 0.91 | 0.80 | 0.91 | 1.20 | 2.22 | 1.84 | 2.27 | 0.73 | 0.90 | 0.87 | 0.95 | 0.50 | 1.01 | nd | nd |
| Zmax(m) | 0.80 | 1.00 | 0.90 | 0.95 | 1.44 | 3.80 | 3.30 | 3.85 | 0.80 | 0.90 | 0.90 | 0.95 | 0.50 | 1.04 | nd | nd |
| Temperature (°C) | 22.47  ±0.23 | 8.20  ±0.10 | 16.97  ±0.06 | 22.33  ±0.06 | 24.77  ±0.21 | 10.03  ±0.06 | 17.17  ±0.06 | 24.47  ±0.12 | 24.80  ±0.17 | 9.87  ±0.21 | 18.97  ±0.32 | 24.77  ±0.06 | 25.47  ±0.51 | 7.87  ±0.15 | 16.30  ±0.10 | 23.70  ±0.10 |
| Conductivity (μS cm-1) | 11096.67  ±101.16 | 10240.67  ±19.00 | 9076.67  ±11.55 | 8740.00  ±10.00 | 9996.67  ±15.27 | 7800.00  ±320.47 | 8950.00  ±17.32 | 8553.33  ±41.63 | 8390.00  ±10.00 | 6186.67  ±179.26 | 8856.67  ±17.32 | 7736.67  ±40.41 | 5623.33  ±40.42 | 4553.33  ±45.09 | 8140.00  ±10.00 | 7156.66  ±49.33 |
| pH | 9.20  ±0.05 | 9.05  ±0.02 | 8.42  ±0.01 | 8.73  ±0.01 | 9.07  ±0.01 | 8.90  ±0.02 | 8.32  ±0 | 8.66  ±0.01 | 9.06  ±0.01 | 9.01  ±0.01 | 8.37  ±0.01 | 8.77  ±0.01 | 8.60  ±0.02 | 8.60  ±0.04 | 8.34  ±0 | 8.69  ±0 |
| Turbidity (NTU) | 104.67  ±0.58 | 242.33  ±4.84 | 273.22  ±5.42 | 170.44  ±2.17 | 74.55  ±3.50 | 100.89  ±4.29 | 184.22  ±13.41 | 160.98  ±3.22 | 69.89  ±7.88 | 112.11  ±1.07 | 231.78  ±2.37 | 142.99  ±18.34 | 37.32  ±3.72 | 51.88  ±1.66 | 230.78  ±1.02 | 121.99  ±9.61 |
| Secchi depth (cm) | 9.50  ±0.50 | 7.83  ±0.29 | 6.00  ±0 | 9.00  ±0 | 3.17  ±0.29 | 9.17  ±0.29 | 8.50  ±0.50 | 9.67  ±0.29 | 11.67  ±0.58 | 9.50  ±0.50 | 7.00  ±0 | 9.50  ±0 | 14.33  ±0.58 | 15.17  ±0.29 | 7.00  ±0 | 9.50  ±0 |
| TDS (mg L-1) | 5.52  ±0.05 | 5.11  ±0.02 | 4.54  ±0.01 | 4.37  ±0.01 | 5.00  ±0.01 | 3.90  ±0.17 | 4.47  ±0.01 | 4.28  ±0.02 | 4.18  ±0.01 | 3.09  ±0.09 | 4.43  ±0.02 | 3.86  ±0.02 | 2.81  ±0.02 | 2.27  ±0.02 | 4.07  ±0.01 | 3.58  ±0.07 |
| N-NH3 (mg L-1) | 0.06  ±0.06 | 0.14  ±0.08 | 0.59  ±0.18 | 0.26  ±0.03 | 0.09  ±0.08 | 1.70  ±0.45 | 0.77  ±0.04 | 0.25  ±0.09 | 0.02  ±0 | 1.10  ±0.37 | 0.81  ±0.54 | 2.25  ±1.79 | 6.84  ±0.34 | 6.99  ±0.31 | 1.93  ±0.19 | 1.16  ±0.18 |
| SRP (mg L-1) | 0.05  ±0.01 | 0.04  ±0.02 | 0.72  ±0.03 | 0.77  ±0.03 | 0.05  ±0.01 | 0.21  ±0.06 | 0.80  ±0.04 | 0.75  ±0.01 | 0.04  ±0.02 | 0.13  ±0.03 | 0.69  ±0.08 | 0.87  ±0.22 | 1.20  ±0.28 | 1.97  ±1.01 | 1.23  ±0.06 | 0.84  ±0.23 |
| Sulphates (mg L-1) | 1907.99  ±112.51 | 866.67  ±106.27 | 596.69  ±59.60 | 1301.85  ±37.04 | 1693.11  ±310.25 | 519.56  ±9.54 | 607.71  ±41.60 | 1264.82  ±37.04 | 1246.83  ±582.59 | 343.25  ±66.80 | 552.62  ±91.03 | 962.35  ±189.15 | 1009.91  ±335.5 | 78.79  ±9.54 | 508.54  ±74.53 | 919.14  ±38.55 |
| Chlorides (mg L-1) | 2133.13  ±13.35 | 2010.35  ±10.15 | 1723.76  ±4.43 | 2248.12  ±6.77 | 1875.54  ±13.43 | 1365.63  ±33.28 | 1689.78  ±5.12 | 2165.40  ±24.40 | 1333.39  ±347.72 | 1098.95  ±8.79 | 1649.90  ±19.98 | 1722.28  ±221.40 | 940.70  ±0 | 737.03  ±2.54 | 1508.10  ±9.22 | 1688.31  ±4.43 |
| DO (mg L-1) | 1.83  ±0.51 | 10.83  ±0.07 | 7.73  ±0.04 | 7.42  ±0.07 | 13.28  ±0.64 | 11.71  ±0.74 | 3.38  ±0.09 | 6.38  ±0.19 | 9.22  ±0.20 | 9.59  ±0.18 | 7.41  ±0.07 | 8.60  ±0.08 | 4.13  ±0.45 | 3.44  ±0.02 | 5.13  ±0.26 | 4.98  ±0.23 |
| COD (mg L-1) | 424.33  ±3.06 | 477.00  ±10.15 | 325.33  ±37.90 | 219.76  ±7.02 | 353.67  ±10.26 | 300.67  ±6.66 | 259.33  ±2.08 | 208.54  ±7.41 | 248.67  ±16.62 | 282.67  ±8.51 | 288.33  ±14.43 | 221.13  ±21.96 | 190.00  ±5.29 | 186.00  ±6.08 | 269.00  ±10.82 | 203.84  ±12.76 |
| CDOM ag254 (nm-1) | 247.62  ±20.96 | 213.22  ±17.98 | 214.10  ±8.60 | 228.75  ±5.66 | 220.60  ±14.03 | 175.21  ±8.15 | 233.20  ±4.87 | 222.96  ±11.82 | 181.84  ±6.05 | 146.93  ±5.31 | 211.65  ±4.92 | 197.52  ±18.57 | 132.77  ±3.08 | 110.39  ±2.32 | 202.08  ±2.38 | 191.26  ±7.16 |
| Water colour ag440 (nm-1) | 5.71  ±0.41 | 7.35  ±5.70 | 8.53  ±0.99 | 6.64  ±2.13 | 5.56  ±0.21 | 8.83  ±4.34 | 9.34  ±1.91 | 7.20  ±3.39 | 5.55  ±0.63 | 5.47  ±1.09 | 7.06  ±1.27 | 5.30  ±0.23 | 6.65  ±0.81 | 4.61  ±0.23 | 8.49  ±1.03 | 6.66  ±2.62 |
| MSI ag250/a365 | 11.51  ±0.60 | 10.88  ±2.50 | 8.21  ±0.51 | 10.20  ±0.84 | 11.41  ±0.15 | 9.55  ±2.09 | 8.13  ±0.68 | 10.04  ±1.50 | 10.41  ±0.30 | 8.49  ±0.62 | 8.88  ±0.50 | 10.22  ±0.32 | 7.70  ±0.34 | 7.59  ±0.02 | 8.03  ±0.33 | 9.41  ±1.14 |
| Chlorophyll-a (μg L-1) | 517.46  ±79.89 | 589.32  ±18.13 | 110.31  ±7.68 | 132.09  ±8.24 | 576.25  ±61.64 | 367.96  ±13.06 | 71.61  ±8.87 | 150.23  ±5.76 | 314.25  ±36.45 | 391.18  ±11.99 | 177.08  ±5.03 | 258.37  ±43.62 | 255.95  ±20.03 | 190.15  ±6.29 | 179.99  ±10.47 | 306.99  ±19.35 |
| TC (MPN/100 mL) | 500 | 300 | 230 | 500 | 2800 | 16000 | 9000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
| FC (MPN/100 mL) | 300 | 300 | 130 | 140 | 300 | 16000 | 5000 | 3500 | 9000 | 3500 | 16000 | 900 | 16000 | 16000 | 16000 | 340 |
| *E. coli* (MPN/100 mL) | 40 | 40 | 80 | 140 | 80 | 110 | 340 | 70 | 440 | 170 | 160 | 105 | 3500 | 120 | 120 | 30 |
| *E. coli* (copy number/100 mL) | 42 | 1727 | 228 | 93 | 2291 | 6128 | 219 | 1851 | 24150 | 62780 | 12165 | 37939 | 24296 | 31422 | 8229 | 10942 |

**Supplementary Fig. 1** Workflow showing total coliforms (TC), fecal coliforms (FC), *E. coli* and the diarrhoeagenic *E. coli* (DEC) detection process.

