

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	Alcalinidad (meqL⁻¹)	DBO₅ (mgL)	Fosfato P_PO₄ (mgL)	Nitrito N_NO₂ (mgL)	Nitrato N_NO₃ (mgL)
AB240	5.25 ± 1.08	0.56 ± 0.52	0.012 ± 0.021	0.003 ± 0	0.282 ± 0.303
AB485	8.1 ± 3.72	6.53 ± 3.23	0.252 ± 0.068	0.025 ± 0.032	2.319 ± 1.235
AB500	10.67 ± 5.06	3.72 ± 3.14	2.583 ± 1.646	0.079 ± 0.089	1.264 ± 1.471
ABB1000	5.48 ± 0.99	1.82 ± 1.97	0.016 ± 0.017	0.004 ± 0.002	9.523 ± 7.53
AC19	3.73 ± 2.4	2.83 ± 3.06	0.024 ± 0.027	0.004 ± 0.002	0.229 ± 0.478
AC223	13.3 ± 5.37	19 ± 18.22	2.327 ± 2.187	0.169 ± 0.267	0.46 ± 0.494
AC25	5.3 ± 1.19	2.08 ± 1.56	0.024 ± 0.024	0.003 ± 0	0.141 ± 0.288
AF700	6.43 ± 0.88	1.68 ± 1.25	0.019 ± 0.031	0.004 ± 0.002	0.766 ± 0.72
AG254	7.39 ± 2.07	3.53 ± 0.5	1 ± 1.083	0.123 ± 0.133	3.806 ± 3.411
AJ364	8.42 ± 4.21	3.12 ± 3.34	1.101 ± 0.949	0.138 ± 0.119	7.51 ± 5.121
AK28	7.57 ± 1.49	1.2 ± 1.3	0.018 ± 0.019	0.003 ± 0	0.221 ± 0.331
AL3200	8.32 ± 1.31	2.25 ± 0.35	0.01 ± 0.014	0.003 ± 0	0.009 ± 0.004
AN260	8.18 ± 2.75	2.4 ± 1.82	0.012 ± 0.02	0.042 ± 0.087	0.422 ± 0.476
AN271	9.39 ± 1.95	2.76 ± 1.48	0.137 ± 0.05	0.079 ± 0.088	3.503 ± 1.03
AO89	8.47 ± 0.84	1.33 ± 1.53	0.04 ± 0.022	0.007 ± 0.003	4.787 ± 2.757
B1000	4.6 ± 1.82	0 ± 0	0.02 ± 0.025	0.003 ± 0	0.74 ± 0.756
B2000	6.84 ± 1.08	0.8 ± 0.75	0.029 ± 0.035	0.003 ± 0.001	0.853 ± 0.437
B2001	5.69 ± 1.39	0.67 ± 0.82	0.017 ± 0.019	0.003 ± 0	0.776 ± 0.831
B213	7.82 ± 2.87	2 ± 1.22	1.442 ± 1.256	0.072 ± 0.133	4.336 ± 3.234
B216	7.45 ± 1.59	2.5 ± 1.87	0.014 ± 0.021	0.003 ± 0	0.461 ± 0.573
C217	5.73 ± 0.82	0 ± 0	0.007 ± 0.009	0.004 ± 0.002	1.864 ± 0.144
C218	7.51 ± 1.42	1 ± 1.41	0.01 ± 0.013	0.004 ± 0.001	2.457 ± 0.567
C454	4.96 ± 2.62	3.55 ± 2.18	0.01 ± 0.016	0.018 ± 0.019	2.353 ± 1.148
D5	6.67 ± 0.13	0 ± 0	0.004 ± 0.001	0.003 ± 0	0.392 ± 0.036
E221	6.45 ± 1.54	1.5 ± 2.12	0.01 ± 0.001	1.177 ± 1.66	0.239 ± 0.329
E553	10.17 ± 0	1 ± 0	0.001 ± 0	0.003 ± 0	2.749 ± 0
F459	9.93 ± 3	5 ± 2.1	0.677 ± 0.625	0.033 ± 0.025	5.448 ± 7.85
F460	9.72 ± 2.02	5.48 ± 5.43	0.081 ± 0.071	0.006 ± 0.004	1.521 ± 1.492
F464	8.53 ± 3.58	9.33 ± 8.39	0.482 ± 0.446	0.129 ± 0.073	2.645 ± 2.031
G3000	4.54 ± 0.84	1.33 ± 1.03	0.014 ± 0.023	0.003 ± 0	0.149 ± 0.226

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	Amonio N_NH₄ (mgL)	Sílice SiO₂ (mgL)	Sulfato SO₄ (mgL)	Cloro Cl (mgL)	Azufre S (mgL)
AB240	0.003 ± 0.001	1.87 ± 0.45	25.62 ± 10.9	54.16 ± 73.77	6.66 ± 6.46
AB485	0.065 ± 0.105	4.74 ± 0.31	109.29 ± 25.08	246.31 ± 162.62	20.3 ± 19.9
AB500	1.269 ± 2.412	4.44 ± 1.63	82.36 ± 30.93	210.27 ± 80.93	22.99 ± 16.66
ABB1000	0.04 ± 0.051	4.59 ± 1.55	127.39 ± 11.51	379.87 ± 274.08	57.03 ± 43.87
AC19	0.043 ± 0.054	1.13 ± 1.09	68.61 ± 47.2	132.33 ± 248.12	23.96 ± 13.17
AC223	2.895 ± 3.81	6.14 ± 2.12	97.15 ± 33.98	228.62 ± 164.66	30.11 ± 23.45
AC25	0.042 ± 0.083	2.75 ± 0.9	139.53 ± 31.1	30.92 ± 13.62	42.91 ± 22.77
AF700	0.004 ± 0	3.11 ± 2.04	34.75 ± 21.63	61.87 ± 26.35	34.44 ± 33.06
AG254	2.477 ± 3.042	14.62 ± 4.96	163.93 ± 3.85	127.19 ± 63.07	33.32 ± 24.7
AJ364	1.909 ± 3.321	18.21 ± 4.19	140.73 ± 15.71	228.98 ± 116.8	76.15 ± 49.02
AK28	0.029 ± 0.044	3.68 ± 1.57	39.87 ± 7.81	150.55 ± 110.94	20.11 ± 27.52
AL3200	0.004 ± 0	2.61 ± 0.26	30.71 ± 0.16	62.26 ± 27.94	3.9 ± 3.86
AN260	0.032 ± 0.065	3.34 ± 1.06	35.58 ± 17.04	66.39 ± 34.44	6.12 ± 3.37
AN271	0.141 ± 0.121	4.88 ± 2.36	87.24 ± 24.46	99.66 ± 36.29	23.26 ± 18.55
AO89	0.013 ± 0.014	7.27 ± 0.88	128.18 ± 2.93	218.75 ± 125.14	28.45 ± 15.36
B1000	0.009 ± 0.01	5.65 ± 1.48	106.86 ± 42.19	127.82 ± 126.89	55.89 ± 35.58
B2000	0.015 ± 0.019	4.49 ± 1.65	85.56 ± 12.17	75.91 ± 20.22	23.55 ± 24.94
B2001	0.006 ± 0.003	4.64 ± 1.6	122.06 ± 22.83	65.74 ± 18.7	41.63 ± 35.5
B213	0.044 ± 0.046	7.43 ± 0.64	108.24 ± 15.71	535.74 ± 497.19	39.95 ± 35.54
B216	0.003 ± 0.002	8.5 ± 5.1	69.45 ± 16.63	59.47 ± 53.24	18.15 ± 11.5
C217	0.017 ± 0.019	4.5 ± 0.73	79.19 ± 0.43	55.48 ± 7.53	13.23 ± 6.33
C218	0.017 ± 0.002	8.78 ± 2.86	105.43 ± 0.62	209.33 ± 218.26	14.31 ± 1.05
C454	0.013 ± 0.021	3.74 ± 2.05	128.76 ± 18.64	326.93 ± 99.65	28.88 ± 20.79
D5	0.026 ± 0.016	1.94 ± 0.36	56.47 ± 6.34	3259.11 ± 267.74	255.98 ± 243.27
E221	1.404 ± 1.98	1.49 ± 1.96	138.41 ± 4.46	353.11 ± 428.35	26.56 ± 20.35
E553	0.232 ± 0	6.15 ± 0	27.23 ± 0	120.84 ± 0	66.03 ± 0
F459	0.955 ± 1.574	4.62 ± 2.99	107.95 ± 29.9	325.92 ± 46.82	23.92 ± 16.73
F460	0.027 ± 0.034	3.72 ± 2.08	145.01 ± 7.31	345.72 ± 195.43	49.37 ± 35.12
F464	1.415 ± 2.108	4.8 ± 1.68	115.83 ± 38.53	303.26 ± 206.9	18.15 ± 5.8
G3000	0.01 ± 0.01	2 ± 0.4	20.65 ± 22.5	82 ± 140.89	2.21 ± 1.14

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	Magnesio Mg (mgL)	Hierro Fe (mgL)	Calcio Ca (mgL)	Sodio Na (mgL)	Potasio K (mgL)
AB240	9.17 ± 3.45	0.005 ± 0.008	59.45 ± 17.58	12.18 ± 2.84	0.99 ± 0.47
AB485	66.76 ± 31.91	0.019 ± 0.021	68.49 ± 23.25	157.96 ± 61.62	10.8 ± 2.05
AB500	52.97 ± 19.72	0.049 ± 0.048	89.8 ± 43.84	244.75 ± 157.38	21.35 ± 10.67
ABB1000	53.96 ± 17.85	0.012 ± 0.021	74.32 ± 22.79	252.62 ± 110.49	11.81 ± 5.37
AC19	20.07 ± 7.08	0.011 ± 0.01	49.65 ± 17.01	18.05 ± 8.96	1.68 ± 1.02
AC223	29.95 ± 12.03	0.02 ± 0.013	98.88 ± 34.43	166.91 ± 82.15	17.31 ± 9.6
AC25	33.03 ± 9.33	0.009 ± 0.007	93.1 ± 32.75	15.49 ± 6.67	1.14 ± 0.5
AF700	23.92 ± 6.58	0.014 ± 0.013	86.08 ± 20.51	41.35 ± 21.8	1.82 ± 0.61
AG254	44.36 ± 20.24	0.002 ± 0.002	97.23 ± 55.13	107.69 ± 61.21	19.64 ± 25.1
AJ364	47.16 ± 14.12	0.006 ± 0.005	131.17 ± 42.55	132.82 ± 28.31	22.91 ± 16.4
AK28	18.9 ± 11.89	0.004 ± 0.004	70.39 ± 26.32	72.62 ± 22.34	5.05 ± 6.71
AL3200	47 ± 4.12	0.002 ± 0.001	56.11 ± 12.28	62.01 ± 4.21	2.72 ± 0.17
AN260	9.46 ± 2.85	0.003 ± 0.004	55.93 ± 11.85	48.67 ± 35.84	1.15 ± 0.31
AN271	27.54 ± 11.04	0.004 ± 0.004	92.35 ± 33	60.04 ± 21.31	4.21 ± 1.88
AO89	51.17 ± 19.72	0.002 ± 0.001	129.26 ± 30.97	118.22 ± 56.45	7.58 ± 3.22
B1000	30.47 ± 10.44	0.004 ± 0.004	82.12 ± 20.99	32.97 ± 11.23	1.63 ± 0.58
B2000	32.66 ± 8.7	0.005 ± 0.004	73.48 ± 38.44	36.63 ± 11.79	1.81 ± 1.11
B2001	31.12 ± 9.48	0.003 ± 0.004	90.8 ± 33.1	29.87 ± 5.93	1.83 ± 1.02
B213	34.98 ± 11.93	0.008 ± 0.007	95.32 ± 36.21	181.16 ± 123.42	9.5 ± 5.56
B216	20.33 ± 4.46	0.004 ± 0.004	67.91 ± 25.6	43.78 ± 53.37	3.01 ± 3.24
C217	16.18 ± 1	0.002 ± 0.001	85.86 ± 3.38	42.28 ± 2.95	2.95 ± 0.39
C218	18.69 ± 3.25	0.002 ± 0.001	101.14 ± 24.98	38.14 ± 5.32	2.55 ± 0.51
C454	40.61 ± 19.03	0.003 ± 0.004	100.01 ± 38.1	133.31 ± 67.75	6.93 ± 5.16
D5	188.79 ± 127.58	0.051 ± 0.07	98.95 ± 59.47	1921.3 ± 1594.81	63.6 ± 44.12
E221	49.3 ± 35.22	0.252 ± 0.351	120.73 ± 87.43	550.9 ± 453.4	35.41 ± 30.6
E553	39.8 ± 0	0.01 ± 0	95.3 ± 0	64.77 ± 0	2.14 ± 0
F459	58.05 ± 26.24	0.025 ± 0.017	59.96 ± 32.69	196.32 ± 68.13	15.17 ± 7.84
F460	72.27 ± 35.03	0.002 ± 0.003	48.54 ± 26.05	192.96 ± 81.38	13.56 ± 7.13
F464	60.17 ± 20.92	0.013 ± 0.012	68.43 ± 29.61	145.4 ± 32.12	11.95 ± 2.16
G3000	10.39 ± 2.93	0.006 ± 0.007	47.76 ± 19.79	14.45 ± 6.45	0.98 ± 0.43

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	Caudal (Ls ⁻¹)	Temperatura agua (°C)	Temperatura aire (°C)	Oxígeno (%)	Oxígeno (mgL)
AB240	39.66 ± 59.92	13.27 ± 1.01	15.08 ± 4.27	96.52 ± 8.98	9.38 ± 0.85
AB485	35.08 ± 42.59	13 ± 4.61	17.47 ± 9.94	97.43 ± 9.16	10.24 ± 1.06
AB500	43.13 ± 105.64	16.88 ± 5.49	19.88 ± 5.41	52.43 ± 51.56	4.84 ± 4.42
ABB1000	150.01 ± 103.06	17.73 ± 1.48	16.92 ± 4.1	81.42 ± 3.76	7.66 ± 0.51
AC19	0 ± 0	13.93 ± 2.93	16.6 ± 3.14	89.54 ± 22.87	8.93 ± 2.37
AC223	15.48 ± 37.93	17.38 ± 5.81	18.07 ± 2.79	43.68 ± 34.96	4.44 ± 3.6
AC25	8.47 ± 19.11	15.28 ± 6.42	16.5 ± 7.52	101.62 ± 4.17	9.85 ± 0.62
AF700	23.03 ± 26.95	12.49 ± 3.65	16.8 ± 2.16	96.34 ± 11.3	10.04 ± 2.38
AG254	74.59 ± 116.78	13.03 ± 4.18	19.3 ± 5.23	65.85 ± 48.56	7.08 ± 5.13
AJ364	45.56 ± 73.16	13.83 ± 3.76	19 ± 6.31	60.05 ± 20.48	6.16 ± 2.45
AK28	4.13 ± 6.87	16.32 ± 3.67	17.74 ± 2.95	98.22 ± 19.13	9.65 ± 1.87
AL3200	17.75 ± 25.1	11.03 ± 4.63	14.1 ± 0.99	97.85 ± 11.81	10.53 ± 0.24
AN260	3.2 ± 4.8	15.9 ± 3.03	18.14 ± 3.53	94.07 ± 17.49	9.07 ± 1.82
AN271	143.06 ± 143.56	16.11 ± 2.99	17.66 ± 3.5	106.49 ± 23.62	10.48 ± 2.04
AO89	40.61 ± 44.68	15.25 ± 1.21	16.03 ± 1.98	85.08 ± 15.16	8.61 ± 1.79
B1000	13.04 ± 23.02	16.71 ± 2.04	18.23 ± 1.85	101.64 ± 6.97	9.83 ± 0.75
B2000	7.26 ± 7.04	14.77 ± 1.45	18.08 ± 3.23	95.07 ± 12.01	9.39 ± 1.15
B2001	25.17 ± 34.31	14.87 ± 3	17.08 ± 3.62	90.58 ± 9.76	9.15 ± 1.36
B213	143 ± 123.91	16.01 ± 4.07	17.74 ± 5.72	86.13 ± 21.48	8.43 ± 2.39
B216	36.77 ± 87.67	15.71 ± 1.7	21.48 ± 3.94	55.28 ± 34.51	5.43 ± 3.41
C217	17.99 ± 25.45	13.98 ± 5.48	18.2 ± 10.47	93.58 ± 2.23	9.87 ± 0.68
C218	27.13 ± 16.01	13.45 ± 1.63	16.65 ± 4.45	94.73 ± 10.92	10 ± 0.57
C454	17.53 ± 27.18	17.16 ± 5.29	16.4 ± 5.66	111.71 ± 35.42	10.41 ± 3.49
D5	36.15 ± 51.13	17.68 ± 0.46	18.45 ± 1.06	95.55 ± 9.19	9.23 ± 0.84
E221	50.37 ± 71.23	12.78 ± 4.84	12.35 ± 4.45	107.08 ± 11.91	11.79 ± 2.06
E553	22.78 ± 0	12.95 ± 0	15.3 ± 0	84.95 ± 0	9.29 ± 0
F459	56.6 ± 74.56	15.69 ± 4.82	20.18 ± 4.96	55.72 ± 24.44	5.64 ± 2.72
F460	15.47 ± 23.99	14.27 ± 2.81	19.89 ± 6.86	83.21 ± 15.05	8.46 ± 1.89
F464	17 ± 12.89	13.7 ± 5.96	17.37 ± 11.84	58.55 ± 23.21	6.36 ± 3.07
G3000	87.05 ± 182.43	13.5 ± 3.25	17.23 ± 3.84	100.45 ± 4.02	10.03 ± 0.9

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	pH	Conductivida eléctrica (mScm⁻¹)	Clorofila a (mgm²)	Peso seco libre de cenizas (gm²)
AB240	7.5 ± 0.57	396.3 ± 64.14	7.86 ± 6.17	8.58 ± 6.52
AB485	8.14 ± 0.16	1383.5 ± 587.97	9.25 ± 3.42	9.37 ± 5.64
AB500	7.76 ± 0.19	1445.83 ± 473.82	20.89 ± 18.67	19.27 ± 12.98
ABB1000	7.18 ± 0.23	2426.8 ± 383.85	31.36 ± 15.37	11.55 ± 4.07
AC19	8.06 ± 0.44	531.95 ± 204.6	5.21 ± 3.81	9.25 ± 9.29
AC223	7.6 ± 0.74	1768.42 ± 692.34	43.67 ± 29.9	29.78 ± 16.41
AC25	8.26 ± 0.15	635.5 ± 109.99	7.77 ± 5.91	9.38 ± 5.03
AF700	8.05 ± 0.13	662.63 ± 145.32	15.54 ± 6.3	21.7 ± 16.82
AG254	7.79 ± 0.09	1694.92 ± 296.79	45.2 ± 56.16	24.63 ± 13.76
AJ364	7.58 ± 0.31	1595.71 ± 312.94	14.61 ± 8.21	10.87 ± 4.44
AK28	7.6 ± 0.49	799.86 ± 88.76	5.33 ± 5.99	5.26 ± 2.86
AL3200	7.91 ± 0.03	782.71 ± 220.92	2.69 ± 0.34	3.7 ± 0.38
AN260	7.72 ± 0.23	695.85 ± 69.96	6.51 ± 8.67	7.1 ± 3.95
AN271	7.88 ± 0.3	1106.9 ± 139.07	14.49 ± 10.5	12.62 ± 13.29
AO89	7.9 ± 0.07	1424.17 ± 130.33	34.01 ± 26.62	23.81 ± 4.51
B1000	7.9 ± 0.05	1004.13 ± 231.68	10.6 ± 6.26	8.81 ± 6.34
B2000	7.96 ± 0.15	860.24 ± 231.18	2.93 ± 2.52	1.6 ± 0.74
B2001	8.02 ± 0.28	904.51 ± 280.67	6.76 ± 7.72	3.93 ± 3.4
B213	8.02 ± 0.22	2398.1 ± 1102.76	22.51 ± 17.9	7.08 ± 4.42
B216	7.41 ± 0.44	672.12 ± 161.97	9.78 ± 8.16	8.2 ± 5.12
C217	8.16 ± 0.14	661.5 ± 113.14	36.8 ± 40.63	19.18 ± 0.91
C218	7.64 ± 0.02	774.5 ± 59.4	34.19 ± 43.97	11.1 ± 0.46
C454	8.09 ± 0.39	1890.94 ± 381.12	6.32 ± 5.51	4.29 ± 2.62
D5	7.19 ± 0.29	15412.5 ± 6416.99	9.45 ± 12.75	3.23 ± 0.22
E221	7.78 ± 0.62	2687.25 ± 1043.34	46.36 ± 55.98	26.83 ± 5.33
E553	7.31 ± 0	993.5 ± 0	11.54 ± 0	6.11 ± 0
F459	7.92 ± 0.2	2192.36 ± 714.96	25.8 ± 26.97	18.52 ± 5.27
F460	8.01 ± 0.2	1872.5 ± 405.27	22.04 ± 14.77	5.45 ± 1.38
F464	7.94 ± 0.35	1400.5 ± 279.35	50.17 ± 20.81	62.54 ± 52.82
G3000	8.1 ± 0.59	379.33 ± 115.68	8.74 ± 7.87	15.41 ± 16.46

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	Alcalinidad (meqL⁻¹)	DBO₅ (mgL)	Fosfato P_PO₄ (mgL)	Nitrito N_NO₂ (mgL)	Nitrato N_NO₃ (mgL)
H1000	5.76 ± 1.04	1.5 ± 0.84	0.008 ± 0.011	0.003 ± 0.001	0.514 ± 0.464
H12	4.19 ± 1.19	2 ± 1.67	0.02 ± 0.021	0.003 ± 0	0.323 ± 0.495
H220	2.77 ± 0.94	3.15 ± 1.46	0.024 ± 0.023	0.004 ± 0.003	0.306 ± 0.44
J13	6.93 ± 1.7	1.25 ± 1.17	0.025 ± 0.029	0.01 ± 0.017	0.088 ± 0.073
J560	5.41 ± 0.39	2 ± 2	0.052 ± 0.048	0.003 ± 0.001	4.626 ± 1.09
K2100	4.32 ± 0.44	3.25 ± 1.89	0.019 ± 0.025	0.003 ± 0.001	0.637 ± 0.718
K2101	4.44 ± 0.74	1.83 ± 1.83	0.02 ± 0.016	0.008 ± 0.005	1.1 ± 0.812
K23	4.71 ± 1.59	1.6 ± 1.52	0.012 ± 0.017	0.009 ± 0.009	0.86 ± 0.229
K26	2.54 ± 0.24	0.7 ± 0.99	0.007 ± 0.009	0.003 ± 0	0.448 ± 0.007
K2600	2.91 ± 0.81	1.4 ± 0.89	0.011 ± 0.01	0.003 ± 0	0.476 ± 0.725
K31	4.1 ± 0.54	1.4 ± 1.14	0.014 ± 0.023	0.003 ± 0	0.61 ± 0.632
K3100	5.1 ± 0.66	1.64 ± 0.77	0.012 ± 0.02	0.003 ± 0	0.406 ± 0.324
K31000	6.3 ± 0.21	1 ± 0	0.002 ± 0.001	0.003 ± 0	0.242 ± 0.024
L3000	4.89 ± 1.06	1.17 ± 0.98	0.014 ± 0.02	0.003 ± 0	0.358 ± 0.161
L3001	3.02 ± 0	6 ± 0	0.044 ± 0	0.013 ± 0	1.629 ± 0
L482	5.92 ± 0.88	3 ± 0	0.02 ± 0.017	0.008 ± 0.007	2.285 ± 1.522
L484	7.71 ± 1.54	3.33 ± 2.58	0.077 ± 0.091	0.024 ± 0.021	9.898 ± 13.234
N79	6.2 ± 1.13	0.83 ± 1.6	0.143 ± 0.081	0.005 ± 0.006	2.032 ± 0.514
O502	4.86 ± 0.82	4.67 ± 5.51	0.096 ± 0.077	0.011 ± 0.01	0.134 ± 0.083
Q520	12.2 ± 2.3	2 ± 0	0.002 ± 0.002	0.003 ± 0	3.146 ± 0.211
R380	6.94 ± 0.66	1.25 ± 1.89	0.017 ± 0.022	0.003 ± 0	1.05 ± 0.972
R508	6.8 ± 0.71	2.25 ± 0.5	0.045 ± 0.041	0.003 ± 0	1.86 ± 1.849
R516	14.69 ± 1.22	2.5 ± 3.54	0.001 ± 0	0.003 ± 0	0.855 ± 0.421
S468	8.15 ± 2.64	4 ± 3.39	0.153 ± 0.073	0.022 ± 0.031	1.119 ± 1.153
U470	9.45 ± 3.55	4 ± 3.67	0.028 ± 0.028	0.003 ± 0	1.034 ± 0.687
V319	8.39 ± 0.98	5.02 ± 3.56	0.302 ± 0.342	0.024 ± 0.027	1.81 ± 2.113
V3190	8.09 ± 1.25	1.5 ± 1.64	0.024 ± 0.031	0.047 ± 0.083	0.378 ± 0.375
Y274	3.91 ± 2.25	2.3 ± 1.1	0.022 ± 0.024	0.005 ± 0.003	1.283 ± 0.241
Y286	7.76 ± 1.89	9.17 ± 5.91	1.475 ± 1.766	0.088 ± 0.173	0.95 ± 0.983
Y288	8.22 ± 1.48	2.33 ± 2.73	0.01 ± 0.015	0.003 ± 0	0.371 ± 0.529
Y289	6.39 ± 1.9	4 ± 4.34	0.988 ± 1.037	0.031 ± 0.03	2.768 ± 2.186

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	Amonio N_NH ₄ (mgL)	Sílice SiO ₂ (mgL)	Sulfato SO ₄ (mgL)	Cloro Cl (mgL)	Azufre S (mgL)
H1000	0.013 ± 0.015	2.52 ± 0.95	51.54 ± 30.85	191.4 ± 268.25	17.9 ± 12.77
H12	0.004 ± 0.003	0.93 ± 0.34	20.51 ± 15.63	66.11 ± 102.52	3.47 ± 1.74
H220	0.02 ± 0.021	1.44 ± 0.97	32.59 ± 15.07	106.01 ± 158.86	3.92 ± 2.96
J13	0.034 ± 0.044	4.9 ± 5.94	15.28 ± 7.51	76.54 ± 61.42	8.3 ± 7.02
J560	0.007 ± 0.006	6.02 ± 1.49	149.94 ± 30.87	321.01 ± 248.84	24.3 ± 17.88
K2100	0.007 ± 0.004	3.97 ± 1.94	124.08 ± 52.18	30.6 ± 6.46	34.14 ± 19.21
K2101	0.014 ± 0.016	3.47 ± 1.71	104.99 ± 41.75	37.15 ± 22.76	47.21 ± 35.27
K23	0.015 ± 0.028	1.74 ± 0.72	69.61 ± 32.23	27.99 ± 6.8	30.06 ± 22.3
K26	0.004 ± 0	2.15 ± 0.22	15.4 ± 12.01	40.29 ± 35.27	1.96 ± 1.02
K2600	0.004 ± 0.003	1.77 ± 0.56	21.67 ± 31.82	52.19 ± 45.46	2.61 ± 1.42
K31	0.117 ± 0.253	1.64 ± 1.01	57.42 ± 35.83	147 ± 164.09	24.37 ± 19.77
K3100	0.003 ± 0.002	2.49 ± 0.35	83.63 ± 33.83	24.76 ± 0.68	22.69 ± 13
K31000	0.002 ± 0.002	1.74 ± 0.36	60.46 ± 8.75	24.52 ± 0.61	43.16 ± 27.99
L3000	0.005 ± 0.006	2.68 ± 0.95	82.28 ± 30.57	86.66 ± 140.88	18.47 ± 14.04
L3001	0.007 ± 0	3.48 ± 0	102.65 ± 0	41.78 ± 0	25.91 ± 0
L482	0.016 ± 0.009	3.93 ± 1.25	165.38 ± 103.98	448.72 ± 290.24	15.36 ± 9.82
L484	0.054 ± 0.073	3.8 ± 2.2	94.9 ± 42.52	163.28 ± 49.62	20.1 ± 8.43
N79	0.038 ± 0.056	9.08 ± 1.87	154.23 ± 23.84	77.18 ± 34.16	81.33 ± 51.77
O502	0.01 ± 0.007	2.23 ± 0.26	313.36 ± 180.7	116.9 ± 99.19	78.17 ± 38.53
Q520	0.001 ± 0	3.04 ± 0.93	63.8 ± 13.47	128.38 ± 52.52	55.13 ± 7.48
R380	0.008 ± 0.008	5.67 ± 1.77	151.45 ± 5.27	213.4 ± 149.12	41.41 ± 26
R508	0.025 ± 0.019	5.21 ± 3.25	89.18 ± 50.49	98.64 ± 33.88	14.71 ± 10.09
R516	0.003 ± 0.004	4.91 ± 0.85	63.8 ± 13.47	139.8 ± 63.68	118.36 ± 47.57
S468	0.042 ± 0.033	3.01 ± 2.28	246.98 ± 200.42	495.29 ± 428.84	83.27 ± 37
U470	0.01 ± 0.009	5.45 ± 3.54	93.93 ± 15.45	189.24 ± 97.14	23.59 ± 17
V319	0.863 ± 1.812	5.85 ± 2.78	101.25 ± 56.81	113.63 ± 102.03	36.1 ± 25.4
V3190	0.043 ± 0.066	5.05 ± 2.29	111.51 ± 26.68	63.9 ± 20.77	24.12 ± 14.29
Y274	0.026 ± 0.031	3.96 ± 1.16	100.21 ± 17.9	28.03 ± 2.16	27.64 ± 13.46
Y286	0.94 ± 1.897	6.48 ± 2.86	104.49 ± 22.5	96.93 ± 39.5	23.77 ± 13.97
Y288	0.01 ± 0.018	5.01 ± 3.6	95.52 ± 13.73	100.61 ± 123.66	25.01 ± 14.63
Y289	0.146 ± 0.242	5.12 ± 2.08	137.3 ± 39.23	82.9 ± 19.83	62.89 ± 45.85

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	Magnesio Mg (mgL)	Hierro Fe (mgL)	Calcio Ca (mgL)	Sodio Na (mgL)	Potasio K (mgL)
H1000	10.12 ± 2.28	0.003 ± 0.004	89.16 ± 20.2	17.04 ± 3.54	0.68 ± 0.47
H12	6.88 ± 1.56	0.003 ± 0.004	46.23 ± 17.79	11.78 ± 5.38	1.2 ± 1.1
H220	5.33 ± 2.22	0.012 ± 0.013	29.63 ± 16.27	18.42 ± 8.86	1.82 ± 2
J13	12.41 ± 2.08	0.087 ± 0.203	78.73 ± 22.63	82.87 ± 131.18	7.78 ± 15.96
J560	55.85 ± 25.15	0.002 ± 0.001	144.97 ± 47.15	207.47 ± 81.52	4.55 ± 1.1
K2100	18.62 ± 7.25	0.002 ± 0.001	96.61 ± 31.19	16.85 ± 3.76	1.68 ± 1.08
K2101	22.21 ± 10.52	0.005 ± 0.008	98.04 ± 49.7	22.27 ± 8.76	2.22 ± 1.49
K23	14.39 ± 5.31	0.006 ± 0.006	71.54 ± 23.82	16.75 ± 4.26	1.89 ± 0.66
K26	4.5 ± 0.03	0.004 ± 0.004	33.39 ± 2.06	12.59 ± 4.39	1.05 ± 0.87
K2600	5.79 ± 1.3	0.004 ± 0.004	32.62 ± 13.26	10.87 ± 6.07	0.78 ± 0.39
K31	12.68 ± 5.12	0.003 ± 0.004	68.84 ± 33.11	14.62 ± 5.2	1.12 ± 0.48
K3100	10.85 ± 3.21	0.003 ± 0.004	57.75 ± 10.33	12.01 ± 3.92	0.85 ± 0.45
K31000	15.95 ± 9.26	0.006 ± 0.006	69.55 ± 39.53	12.68 ± 3.28	0.81 ± 0.42
L3000	18.63 ± 4.87	0.005 ± 0.006	62.08 ± 25.87	17.51 ± 6.49	1.1 ± 0.55
L3001	10.87 ± 0	0.001 ± 0	50.23 ± 0	13.35 ± 0	1.32 ± 0
L482	66.63 ± 32.48	0.014 ± 0.008	73.26 ± 23.39	256.95 ± 99.21	15.15 ± 7.99
L484	43.32 ± 18.6	0.028 ± 0.036	68.11 ± 20.95	154.4 ± 57.87	11.53 ± 5.93
N79	42.81 ± 11.47	0.003 ± 0.004	156.59 ± 48.1	45.29 ± 11.19	5.53 ± 3.19
O502	82.21 ± 32	0.004 ± 0.003	141.17 ± 16.39	188.34 ± 118.96	14.64 ± 7.66
Q520	34.79 ± 5.21	0.006 ± 0.006	74.51 ± 3.95	66.96 ± 14.62	2.43 ± 0.31
R380	44.57 ± 11.58	0.002 ± 0.001	130.03 ± 33.62	179.6 ± 66.63	5.01 ± 3.19
R508	26.74 ± 17.16	0.004 ± 0.003	76.25 ± 19.56	100.36 ± 65.89	7.37 ± 5.57
R516	46.24 ± 3.05	0.011 ± 0.013	122.2 ± 20.93	78.31 ± 3.44	2.27 ± 0.65
S468	82.96 ± 20.54	0.014 ± 0.013	114.71 ± 18.8	201.62 ± 61.5	19.32 ± 6.58
U470	69.24 ± 15.63	0.006 ± 0.003	52.57 ± 4.89	153.38 ± 36.19	10.31 ± 4.47
V319	29.71 ± 11.19	0.007 ± 0.007	104.79 ± 58.45	53.06 ± 19.67	5.69 ± 2.8
V3190	32.38 ± 10.97	0.003 ± 0.004	108.53 ± 47.69	36.75 ± 11.28	2.46 ± 1.02
Y274	17.68 ± 6.57	0.005 ± 0.005	77.5 ± 31.24	15.42 ± 6.47	1.59 ± 0.78
Y286	22.34 ± 8.84	0.009 ± 0.005	76.15 ± 22.27	64.66 ± 43.53	11 ± 9.46
Y288	29.56 ± 9.96	0.003 ± 0.004	85.22 ± 35.62	24.89 ± 9.4	1.89 ± 0.84
Y289	37.69 ± 11.36	0.002 ± 0.002	120.88 ± 37.18	48.61 ± 27.2	7.73 ± 6.49

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	Caudal (Ls⁻¹)	Temperatura agua (°C)	Temperatura aire (°C)	Oxígeno (%)	Oxígeno (mgL)
H1000	11.39 ± 17.65	18.18 ± 5.59	19.32 ± 5.4	111.99 ± 24	9.89 ± 2.21
H12	2.78 ± 6.81	14.03 ± 4.07	15.9 ± 3.88	116.41 ± 28.42	11.26 ± 2.13
H220	4.74 ± 11.61	15.34 ± 5.6	18.13 ± 6.91	113 ± 28.92	11.01 ± 2.16
J13	0 ± 0	16.12 ± 3.66	18.93 ± 3.1	89.57 ± 21.35	8.64 ± 1.83
J560	6.95 ± 10.07	17.17 ± 2.11	20.3 ± 3.05	94.53 ± 0.45	8.94 ± 0.49
K2100	28.03 ± 55.14	18.76 ± 6.62	20.1 ± 8.58	105.29 ± 10.55	9.79 ± 0.89
K2101	100 ± 141.5	16.65 ± 3.82	18.32 ± 2.82	112.55 ± 18.37	10.83 ± 0.97
K23	177.03 ± 236.49	16 ± 2.5	18.96 ± 4.44	113.78 ± 18.94	11.42 ± 1.82
K26	40.34 ± 41.31	13.75 ± 1.13	20.8 ± 7.07	86.68 ± 13.89	8.97 ± 1.68
K2600	13.77 ± 12.63	11.88 ± 5.65	13.52 ± 4.56	101.78 ± 9.78	10.29 ± 0.95
K31	115.39 ± 187.58	16.47 ± 1.8	17.16 ± 5.5	100.16 ± 7.3	9.91 ± 0.39
K3100	13.48 ± 19.4	16.27 ± 1.44	19.98 ± 2	112.28 ± 38.23	10.87 ± 3.5
K31000	18.38 ± 25.99	16 ± 0.49	18.65 ± 5.44	91.03 ± 0.04	8.91 ± 0.13
L3000	20.75 ± 44.43	16.57 ± 1.37	19.24 ± 4.75	95.24 ± 4.68	9.12 ± 0.74
L3001	7.97 ± 0	17.5 ± 0	24.4 ± 0	97.6 ± 0	9.21 ± 0
L482	4.43 ± 6.24	17.19 ± 7.24	19.7 ± 7.18	119.54 ± 19.55	11.84 ± 1.83
L484	22.05 ± 21.47	16.01 ± 4.41	16.88 ± 5.48	95.1 ± 25.06	9.59 ± 2.08
N79	11.7 ± 22.75	16.32 ± 1.07	18.72 ± 4.22	86.15 ± 9.59	8.75 ± 1.56
O502	8.33 ± 7.15	14.37 ± 6.35	25.4 ± 0	87.3 ± 10.43	9.12 ± 2.05
Q520	13.35 ± 6.15	17.4 ± 1.41	17.55 ± 4.6	58.93 ± 10.5	5.78 ± 1.17
R380	5.01 ± 5.26	13.33 ± 3.03	18.08 ± 8.15	91.1 ± 8.53	9.18 ± 0.7
R508	8.88 ± 10.73	12.9 ± 5.88	15.53 ± 5.72	73.73 ± 5.93	7.77 ± 0.95
R516	3.88 ± 4.15	15.68 ± 2.65	19.85 ± 3.04	96.18 ± 0.46	9.67 ± 0.52
S468	4.51 ± 10.08	15.68 ± 7.27	18.66 ± 6.41	90.19 ± 44.1	8.78 ± 3.78
U470	5.94 ± 10.09	13.41 ± 4.48	18.44 ± 6.98	94.91 ± 17.72	9.83 ± 1.91
V319	113.1 ± 219.34	15.93 ± 2.53	18.68 ± 6.91	66.36 ± 31.73	6.45 ± 3.12
V3190	44.48 ± 92.23	14.95 ± 1.71	17.55 ± 4.46	73.33 ± 21.85	7.2 ± 2.17
Y274	59.2 ± 132.38	14.34 ± 3.76	14.58 ± 5.2	85.63 ± 4.4	8.49 ± 0.85
Y286	28.07 ± 53.76	18.18 ± 2.43	19.92 ± 5.16	44.1 ± 31.67	4.38 ± 3.54
Y288	5.75 ± 6.88	15.71 ± 1.09	21.18 ± 5.6	48.32 ± 20.26	4.7 ± 1.98
Y289	9.38 ± 12.43	14.32 ± 4.4	20.32 ± 4.07	69.56 ± 27.95	7.11 ± 3.11

ANEXO IV. Matriz de parámetros físico-químicos

ID_muestreo	pH	Conductivida eléctrica (mScm⁻¹)	Clorofila a (mgm²)	Peso seco libre de cenizas (gm²)
H1000	7.88 ± 0.13	553.75 ± 108.82	9.49 ± 4.37	19.64 ± 20.09
H12	8.26 ± 0.3	362.29 ± 64.73	11.92 ± 13.51	8.22 ± 7.26
H220	8.36 ± 0.56	285.25 ± 52.21	3.17 ± 3.02	5.49 ± 7.02
J13	7.51 ± 0.2	662.04 ± 119.19	7.66 ± 5	9.43 ± 7.48
J560	7.84 ± 0.19	2143.17 ± 251.97	24.05 ± 26.3	12.88 ± 0.86
K2100	8.13 ± 0.15	634.65 ± 156.23	9.78 ± 9.57	15.48 ± 13.17
K2101	8.31 ± 0.22	713.85 ± 233.94	27.57 ± 14.52	14.01 ± 7.23
K23	8.16 ± 0.35	519.3 ± 112.8	30.9 ± 40.71	18.85 ± 8.51
K26	8.3 ± 0.07	244.75 ± 13.79	11.71 ± 8.53	6.17 ± 3.59
K2600	8.21 ± 0.35	244.2 ± 25.87	10.08 ± 11.1	12.64 ± 11.1
K31	8.16 ± 0.3	514.7 ± 134.37	14.76 ± 16.43	6.67 ± 3.23
K3100	7.72 ± 0.4	849.09 ± 749.33	14.17 ± 27.02	6.94 ± 7.64
K31000	7.31 ± 0.09	613.75 ± 2.47	3.95 ± 2.74	0.94 ± 0.08
L3000	8.11 ± 0.37	578.19 ± 102.1	16.12 ± 9.26	29.36 ± 19.54
L3001	8.48 ± 0	782.5 ± 0	12.69 ± 0	35.53 ± 0
L482	8.41 ± 0.23	2480.73 ± 691.45	8.38 ± 9.79	12.72 ± 8.97
L484	7.87 ± 0.31	1431.73 ± 492.99	22.28 ± 13.52	9.7 ± 3.31
N79	7.61 ± 0.14	1226.69 ± 288.48	24.58 ± 23.32	16.49 ± 16.59
O502	7.98 ± 0.08	1700.17 ± 228.48	23.89 ± 21.59	19.89 ± 2.51
Q520	7.13 ± 0.31	1123.5 ± 46.67	8.72 ± 7.52	6.38 ± 0.37
R380	8.01 ± 0.14	2247.42 ± 131.76	19.92 ± 29.25	9.88 ± 7.75
R508	8.02 ± 0.13	1190.25 ± 280.99	19.58 ± 22.54	27.03 ± 13.15
R516	7.74 ± 0.23	1231 ± 92.63	3.47 ± 3.72	3.9 ± 0.31
S468	8.08 ± 0.3	2078.8 ± 340.48	8.39 ± 5.68	17.28 ± 19.05
U470	8.21 ± 0.2	1533.1 ± 309.47	17.49 ± 10.21	10.76 ± 3.97
V319	7.88 ± 0.22	1116.64 ± 306.03	17.92 ± 18.65	16.83 ± 9.76
V3190	7.55 ± 0.23	932.44 ± 245.77	18.18 ± 14.91	12.83 ± 13.96
Y274	7.6 ± 0.56	595.5 ± 65.13	10.25 ± 7.1	16.74 ± 15.03
Y286	7.7 ± 0.22	1111.63 ± 256.07	21.37 ± 23.58	17.92 ± 16.33
Y288	7.27 ± 0.37	962.14 ± 290.56	21.79 ± 25.61	14.79 ± 14.92
Y289	7.88 ± 0.36	1131.51 ± 325.92	17.27 ± 12.43	13.13 ± 13.87

