

Supplementary Information

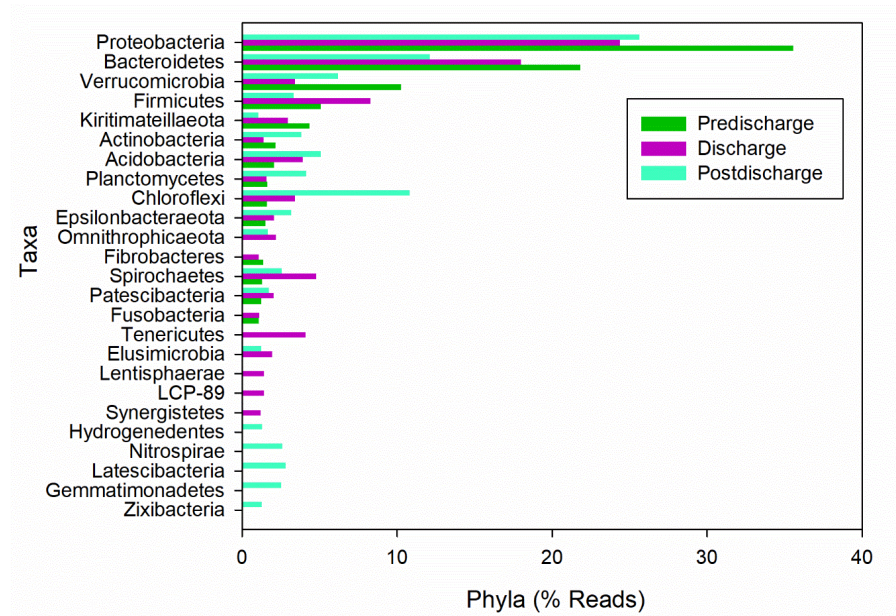


Figure S1: Graph representation of SIMPER analysis comparing the most dominant phyla between pre discharge, discharge and post discharge stations.

Table S1: Benthic microbial community comparison between winter (W) and summer (S) sequences reads retrieved at El Sauce estuary sampling stations.

Domain	Phylum	F2W	F2S	F3*W	F3*S	E7W	E10W	E10S	E11W	E11S
Archaea	Altiarchaeota	0	0	0	0	0	2	0	7	2
Archaea	Asgardaeota	0	0	24	13	0	47	559	59	180
Archaea	Crenarchaeota	0	0	25	18	5	18	313	169	122
Archaea	Diapherotrites	0	0	145	2	3	0	75	112	46
Archaea	Euryarchaeota	3	46	2217	296	109	11	884	621	1076
Archaea	Hadesarchaeaeota	0	0	0	2	0	0	0	0	2
Archaea	Nanoarchaeaeota	31	120	774	972	149	601	1783	2109	2586
Archaea	Thaumarchaeota	0	0	11	0	43	0	749	27	67
Bacteria	Acetothermia	0	0	10	0	0	0	0	3	2142
Bacteria	Acidobacteria	388	545	5006	2833	4322	6928	11231	5844	4732
Bacteria	Actinobacteria	288	132	6496	541	3519	5308	2642	2685	3085
Bacteria	Aegiribacteria	0	0	288	0	17	0	11	8	22
Bacteria	Armatimonadetes	6	16	471	117	65	174	510	127	253
Bacteria	Atribacteria	0	0	7	0	0	0	0	0	44
Bacteria	BRC1	4	7	65	57	36	78	200	121	243
Bacteria	Bacteroidetes	44002	8323	55008	54948	58332	30231	30453	53409	25385
Bacteria	CK-2C2-2	0	0	0	5	0	0	21	0	14
Bacteria	Caldiserica	0	4	1022	22	60	0	21	0	67
Bacteria	Calditrichaeota	0	0	162	4	3	0	50	11	308
Bacteria	Chlamydiae	43	15	392	158	277	97	258	64	93
Bacteria	Chloroflexi	177	547	8725	1862	1971	38728	18664	25509	20005
Bacteria	Cloacimonetes	2	78	307	785	7	6	33	72	76
Bacteria	Cyanobacteria	82981	3137	1945	21366	10416	23644	13876	20707	16261
Bacteria	Dadabacteria	0	0	0	0	2	0	0	4	0
Bacteria	Deinococcus-Thermus	0	0	0	0	0	0	0	0	47
Bacteria	Dependentiae	6	0	1092	41	217	188	256	56	196
Bacteria	Elusimicrobia	61	92	2277	747	244	153	487	595	752
Bacteria	Epsilonbacteraeota	154	49	9541	739	3112	4602	638	2976	2952
Bacteria	FBP	0	0	4	6	14	2	16	0	5
Bacteria	FCPU426	0	12	162	103	8	8	42	79	61
Bacteria	Fibrobacteres	88	47	214	519	27	155	410	331	420
Bacteria	Firmicutes	1539	1615	14477	10825	1825	1405	2696	2652	3406
Bacteria	Fusobacteria	106	30	172	284	161	29	45	71	71
Bacteria	GN01	0	0	17	0	0	0	6	0	0
Bacteria	Gemmatimonadetes	44	10	133	134	1738	1478	2165	2031	747
Bacteria	Halanaerobiaeota	0	0	0	0	0	8	10	0	11
Bacteria	Hydrogenedentes	63	47	56	448	378	194	461	190	458

Bacteria	Kiritimatiellaeota	1204	437	1502	3056	195	256	278	356	831
Bacteria	LCP-89	10	138	332	1012	13	0	33	68	132
Bacteria	Latescibacteria	19	47	270	172	145	755	4869	2185	1945
Bacteria	Lentisphaerae	47	47	428	496	118	91	242	487	138
Bacteria	Margulisbacteria	0	7	194	48	5	0	42	9	41
Bacteria	Marinimicrobia (SAR406 clade)	0	0	0	0	0	0	0	0	2
Bacteria	Modulibacteria	2	0	20	0	0	0	0	0	18
Bacteria	Nitrospinae	9	0	0	15	74	0	45	0	183
Bacteria	Nitrospirae	28	173	27	192	197	862	5187	2312	911
Bacteria	Omnitrophicaeota	14	100	3464	817	311	359	1122	606	1419
Bacteria	PAUC34f	0	0	0	0	0	0	15	26	22
Bacteria	Patescibacteria	659	131	4272	1287	1199	967	1831	2739	2418
Bacteria	Planctomycetes	182	145	383	1145	816	4440	5959	3014	4070
Bacteria	Proteobacteria	79993	23951	100164	119601	151523	144983	96890	140764	100876
Bacteria	Rokubacteria	2	9	50	44	13	55	249	16	63
Bacteria	Spirochaetes	112	552	7861	4014	368	488	4350	1876	2719
Bacteria	Synergistetes	2	34	519	194	29	17	5	53	93
Bacteria	TA06	0	0	0	0	0	0	0	0	2
Bacteria	Tenericutes	54	320	10145	2525	1103	13	40	166	399
Bacteria	Thermotogae	0	0	86	0	0	0	5	0	10
Bacteria	Verrucomicrobia	14017	1859	1804	12730	6731	7565	5362	7356	6256
Bacteria	WOR-1	0	3	340	55	53	2	48	29	233
Bacteria	WPS-2	0	20	0	107	57	5	0	13	0
Bacteria	WS1	0	0	9	7	0	6	96	25	41
Bacteria	WS2	0	0	4	0	0	0	29	0	12
Bacteria	WS4	0	0	85	0	2	5	17	0	46
Bacteria	Zixibacteria	0	20	730	45	42	103	1170	649	2247

*Discharge sampling station

Table S2: Spearman correlation analyses between functional group abundance quantification (qPCR) and the physicochemical variables studied.

	Ammonia Oxidizers	Comammox	Methanotrophs	Methanogens
Water Temperature (°C)	0.385	0.711 *	0.661 *	0.559
pH (pH unit)	0.250	0.200	0.300	0.236
Conductivity (µS/cm)	0.033	0.683 *	0.650	0.552
Dissolved Oxygen (mg/L)	0.183	0.283	0.317	0.406
DTS (mg/L)	0.033	0.683 *	0.650	0.552
Transparency (cm)	-0.050	-0.201	-0.251	0.215
Turbidity (NTU)	-0.400	0.067	0.050	0.103
Color (Pt/C)	-0.233	-0.100	-0.117	-0.018
Sulfate (mg/L)	-0.433	0.283	0.233	0.600
Chlorides (mg/L)	-0.075	-0.142	-0.142	0.280
Total Coliforms (NMP)	-0.025	-0.050	-0.067	-0.134
Fecal Coliforms (NMP)	0.101	0.050	0.067	0.061
BOD₅ (mg/L)	0.367	0.833 **	0.850 ***	0.103
Chlorophyll a (mg/L)	0.500	0.550	0.517	0.091
CO ₂ (µM)	-0.133	-0.367	-0.383	-0.224
CH ₄ (nM)	-0.083	0.167	0.033	0.455
N ₂ O (nM)	-0.200	-0.033	-0.083	0.139
Nitrate (mg/L)	0.483	0.217	0.233	-0.418
Nitrite (mg/L)	0.350	0.417	0.450	-0.079
Phosphate (mg/L)	-0.050	-0.600	-0.533	-0.927 ***
Silicate (mg/L)	-0.250	-0.433	-0.450	0.018
Nitrate/Phosphate	0.483	0.517	0.533	0.370
Total Organic Matter (g)	0.333	0.700 *	0.667 *	0.576
C/N	-0.083	-0.317	-0.267	0.018
δ¹⁵N	0.833 **	0.717 *	0.700 *	0.346
Gravel (g)	0.100	0.033	0.117	-0.261
Very Coarse Sand (g)	0.267	0.300	0.333	0.236
Coarse Sand (g)	-0.500	-0.033	-0.150	0.358
Medium Sand (g)	-0.583	-0.367	-0.417	0.127
Fine Sand (g)	-0.433	-0.333	-0.317	-0.164
Very Fine Sand (g)	0.433	0.533	0.567	0.139
Silt (g)	0.450	-0.083	-0.050	-0.079

Significant level (* < 0.05, ** < 0.01, *** < 0.001)