

Table S1. Sampling stations and environmental parameters

Station	Season	Temp (°C)	DO (mg/L)	pH	Salinity(g/L)
S1	Summer	20.40	24.55	8.48	0.16
S2	Summer	21.70	9.77	8.57	0.13
S3	Summer	22.10	13.79	8.71	0.11
S4	Summer	23.50	16.75	8.89	0.19
S5	Summer	23.80	12.09	8.85	0.22
S6	Summer	24.20	9.9	8.76	0.79
S7	Summer	16.20	9.63	7.97	25.17
S8	Summer	16.80	10.7	7.96	25.26
S1	Winter	4.05	16.08	8.16	0.43
S2	Winter	4.23	26.01	8.02	0.38
S4	Winter	4.02	21.76	8.18	2.02
S5	Winter	5.06	28.02	8.16	1.43
S7	Winter	5.21	22.77	7.58	24.51
S8	Winter	5.43	22.13	7.30	24.78

Table S2. Molecular abundances of LP in different habitats and seasons

Station	Season	Habitat	Molecular Abundance ($\times 10^4$ copies/L)
S1	Summer	Freshwater	8.33 ± 3.88
S2	Summer	Freshwater	2.25 ± 1.15
S3	Summer	Freshwater	1.80 ± 0.57
S4	Summer	Freshwater	8.87 ± 2.22
S5	Summer	Freshwater	11.42 ± 2.20
S6	Summer	Brackish water	256.04 ± 59.81
S7	Summer	Saline water	15.03 ± 7.27
S8	Summer	Saline water	17.68 ± 2.65
S1	Winter	Freshwater	4.01 ± 0.80
S2	Winter	Freshwater	822.73 ± 157.81
S4	Winter	Brackish water	168.49 ± 6.59
S5	Winter	Brackish water	356.26 ± 25.25
S7	Winter	Saline water	686.28 ± 39.89
S8	Winter	Saline water	1639.00 ± 609.97