
Supporting materials

S1 Physicochemical properties of collected sediment and surface water samples

Surface sediments (0–10 cm) were collected using a Peterson dredge and transported to the laboratory under low-temperature (4°C), dark conditions to maintain their integrity. The sediments were thoroughly homogenized, with large debris removed, for subsequent analysis. Surface water was collected using a plexiglass water collector and filtered through a 0.45- μ m pore size filter to remove particulate matter. The physicochemical properties of the sediment and water samples are detailed below in Table S1.

Table S1 Physicochemical properties of collected sediment and surface water samples.

Parameter	Sediment	Overlying water
NH ₄ ⁺ -N	0.0038 mg/g	0.11 mg/L
NO ₃ ⁻ -N	0.0002 mg/g	2.43 mg/L
TN	0.53 mg/g	1.54 mg/L
DOC	56.06 mg/kg	17.13 mg/L
TOC	8.43 mg/g	–
TC	13.83 mg/g	–

S2 Primers and Q-PCR thermal cycling conditions of targeted genes

Table S2 Primers and Q-PCR thermal cycling conditions of targeted genes.

Target gene	Primer	Sequence	Annealing temperature	Reference
<i>16S</i>	515F	GTGCCAGCMGCCGCGTAA	58°C	Walters et al. (2016)
<i>rRNA</i>	926R	CCGYCAATTYMTTTRAGTTT		
<i>nirS</i>	nirS1F	CCTA(C/T)TGGCCGCC(A/G)CA(A/G)T	58°C	Lisa et al. (2015)
	nirS-qR	TCCMAGCCRCCRTCRTGCAG		
<i>nirK</i>	nirKF1aCu	ATCATGGTSCTGCCGCG	58°C	Li et al. (2016)
	nirKR3Cu	GCCTCGATCAGRTTGTGGTT		
<i>pmoA</i>	ME1	GCMATGCARATHGGWATGTC	58°C	Lyautey et al. (2021)
	ME2	TCATKGCRTAGTTDGGRTAGT		
<i>mcrA</i>	F	GGTGGTGMGGDTTCACMCARTA	58°C	(2021)
	R	CGTTCATBGCCTAGTTVGGRTAGT		

S3 Changes in bacterial composition at the genus level

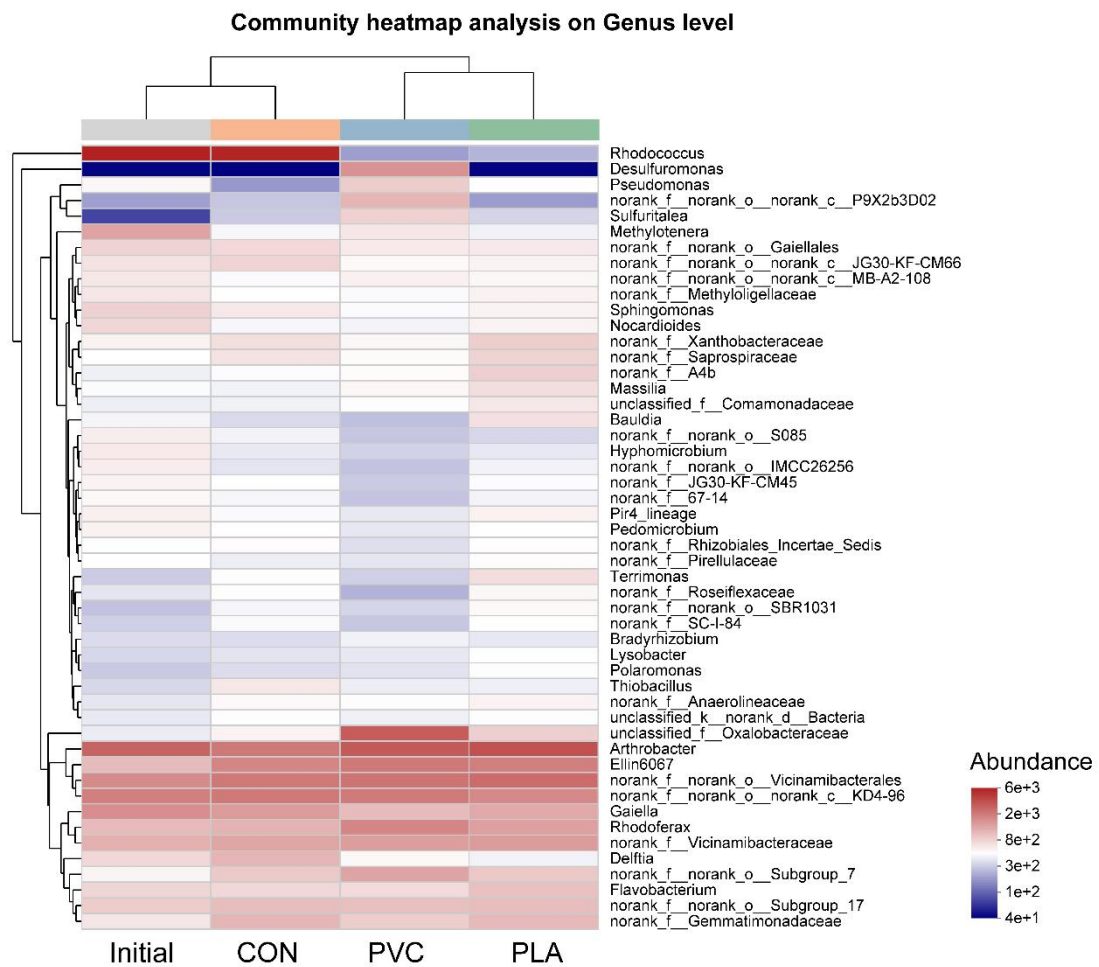


Fig. S1 The composition of the microbial community structure at the genus level. Initial group refers to sediment microbial community before incubation.

S4 Biomarkers identified by LEfSe analysis

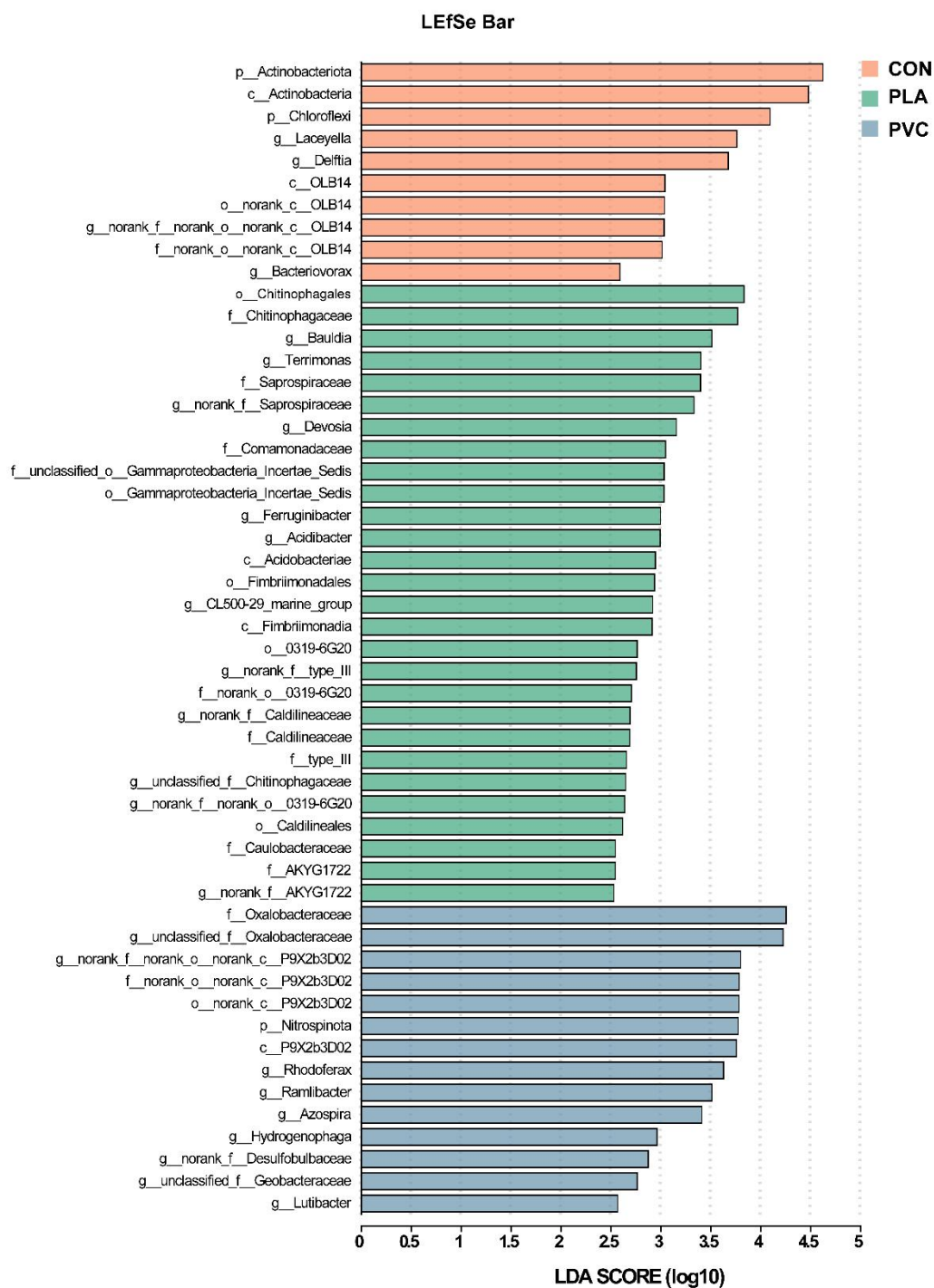


Fig. S2 Bacterial biomarkers in CON and MP treatments based on the linear discriminant analysis effect size analysis (LEfSe). The LDA score identified the size of differentiation between CON and MP treatments with a threshold value of 2.5.

S5 Changes in sediment bacterial function

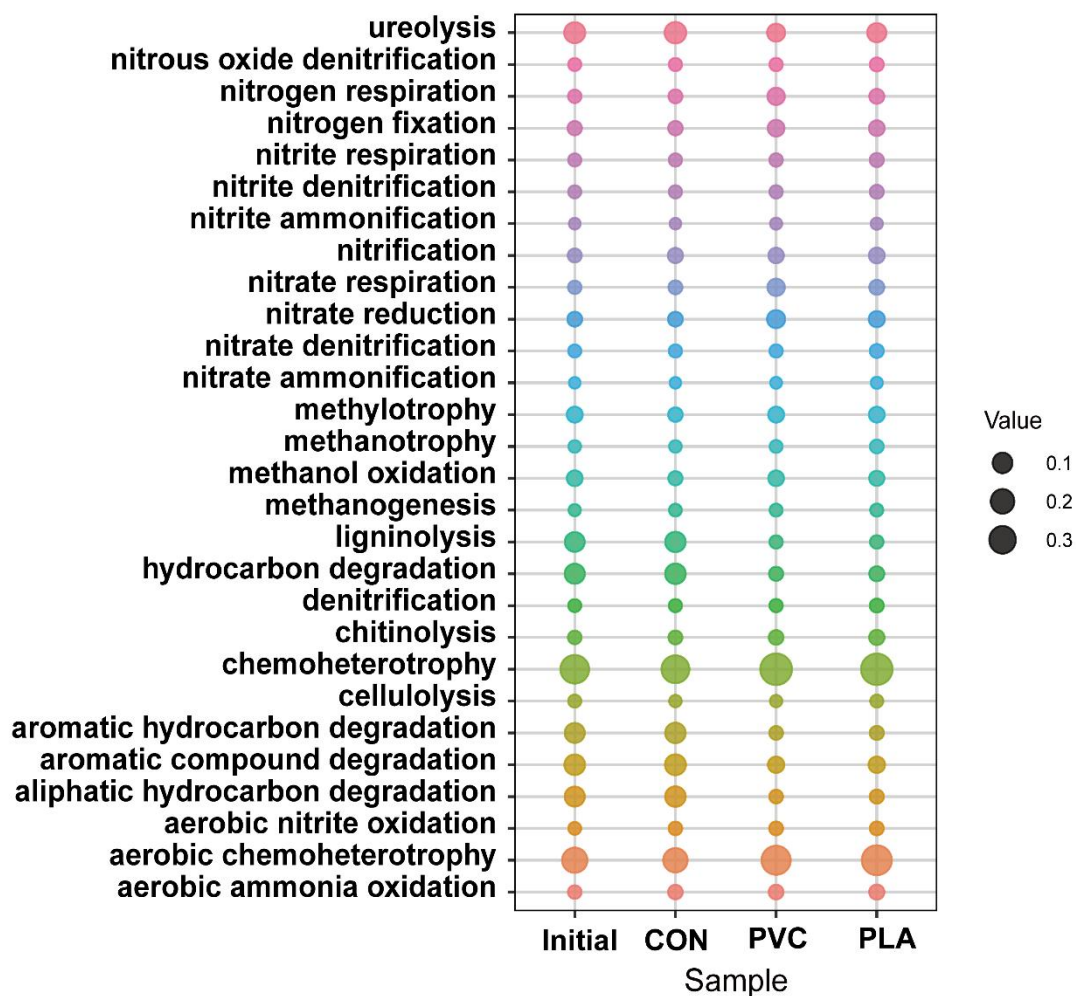


Fig. S3 Effects of MPs on the sediment bacterial functions annotated by FAPROTAX database.

S6 Correlations between biotic and abiotic attributes

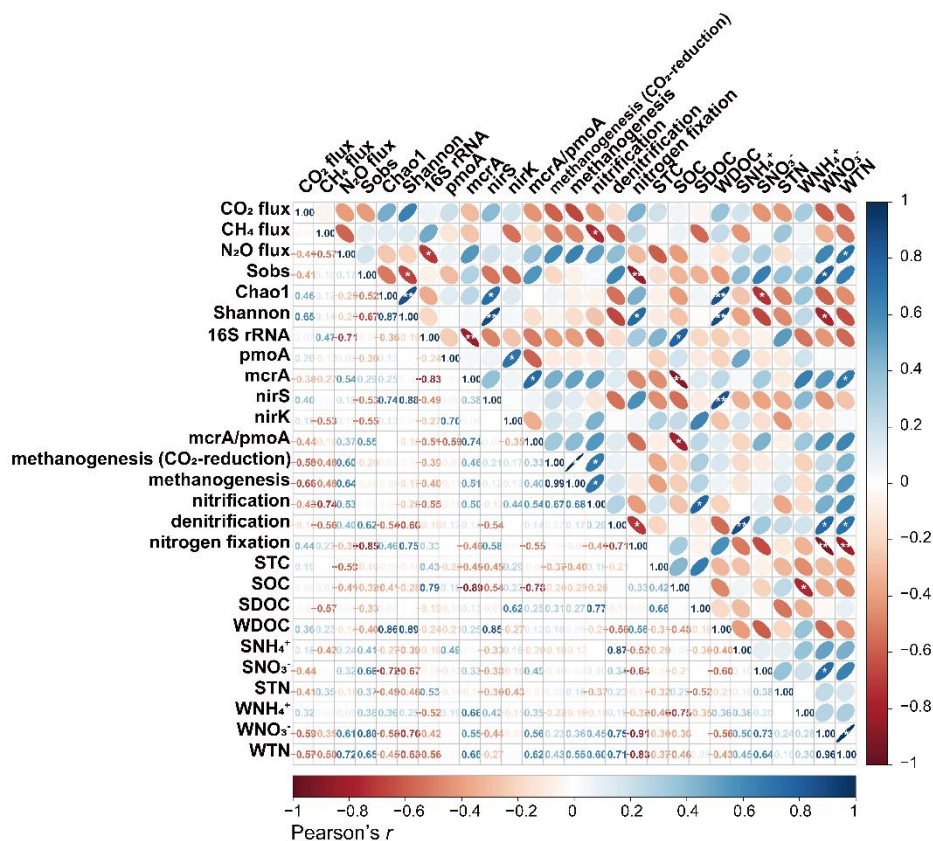


Fig. S4 Pearson's correlations among sediment-water physiochemical properties, greenhouse gas emissions, functional gene abundance, and bacterial functions. (*: Pearson's $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$).

References

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