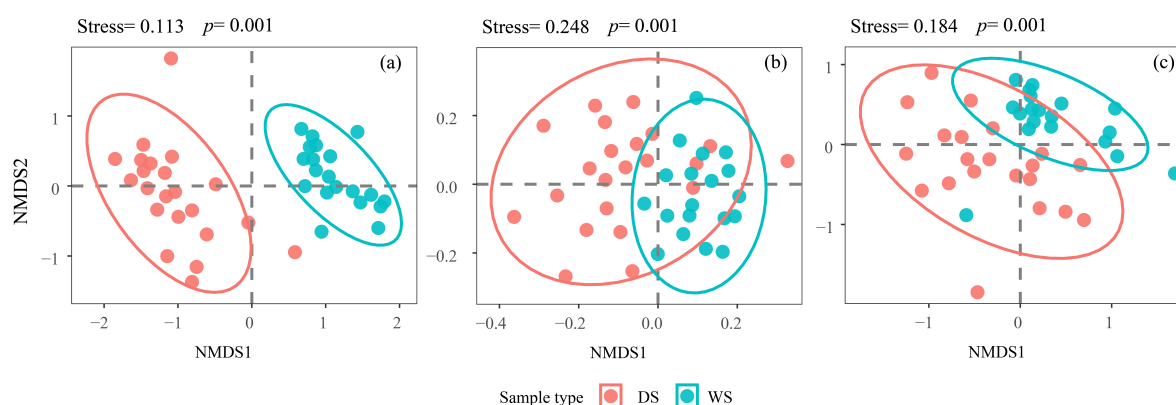
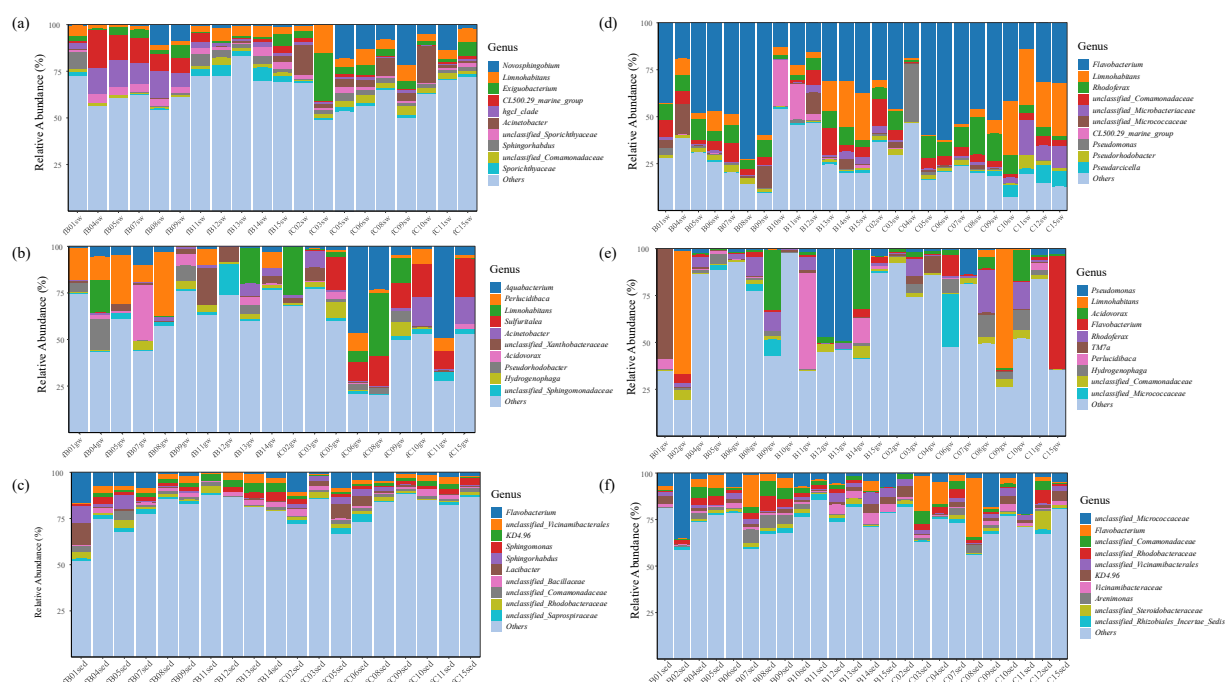
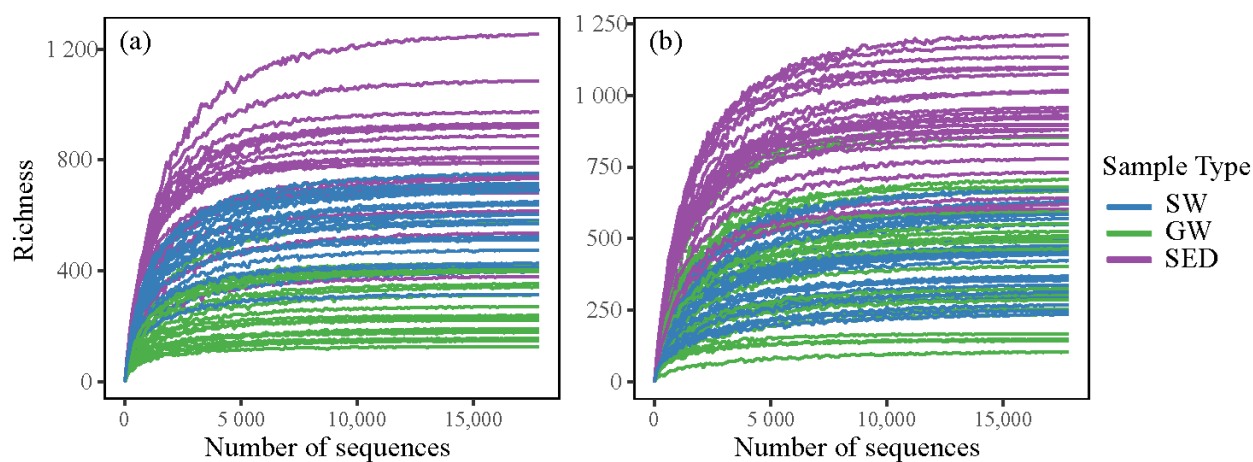




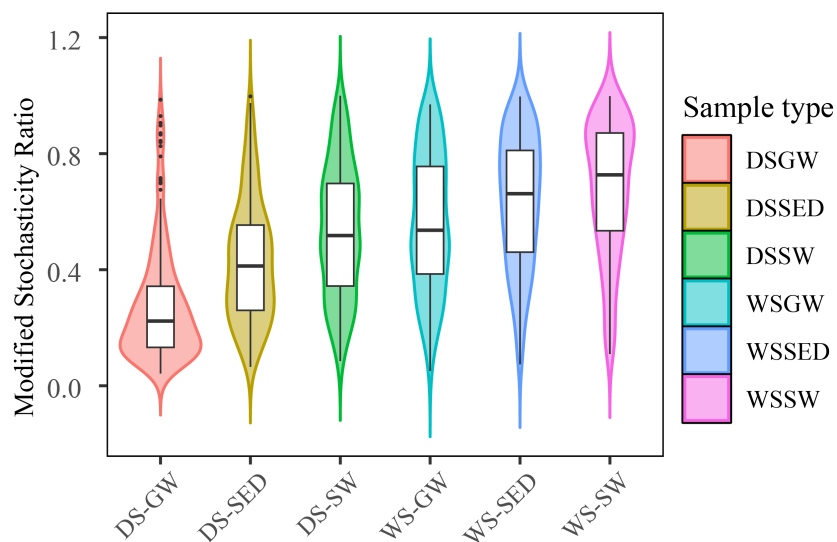


Figure S5. Modified Stochasticity Ratio (MST) across habitats and seasons. Box-and-whisker plots show MST values (mean $\pm$ SD) for surface water (SW), groundwater (GW), and sediment (SED) during the wet (WS) and dry (DS) seasons.

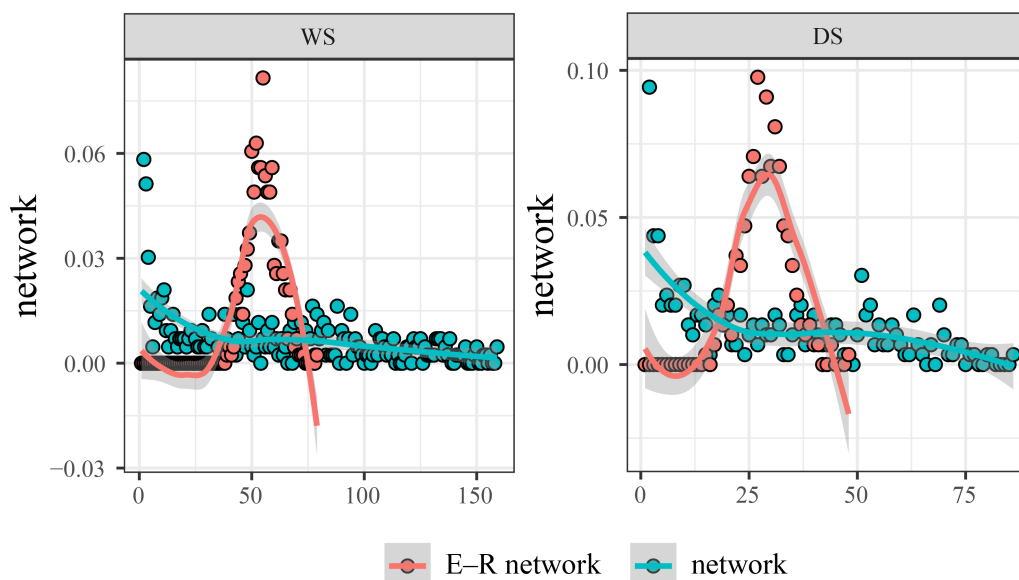


Figure S6. Comparison between the observed microbial community network and the E-R random network model.

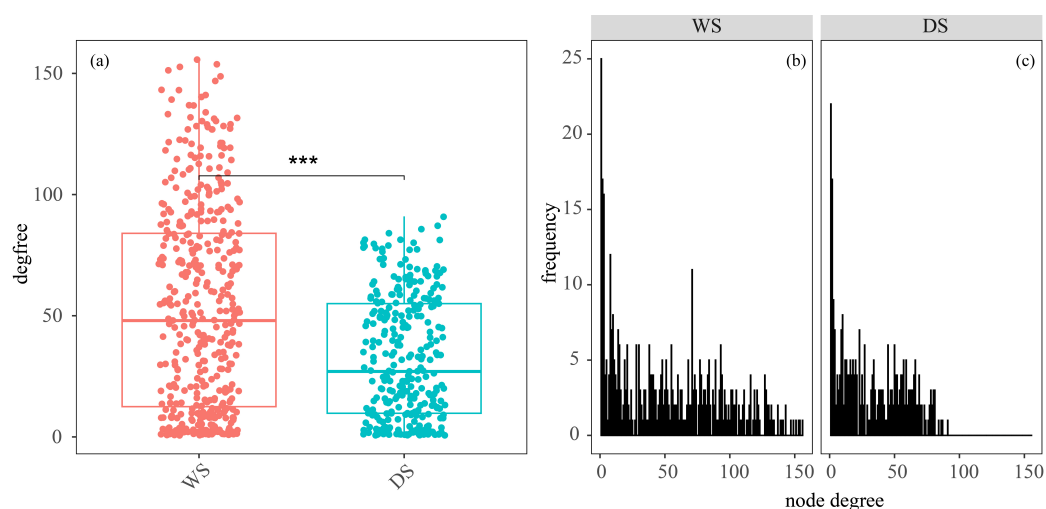


Figure S7. Differences in network node degree between wet-season and dry-season networks (a) and their degree distributions (b,c). The meanings represented by different asterisks. *** $p < 0.001$.

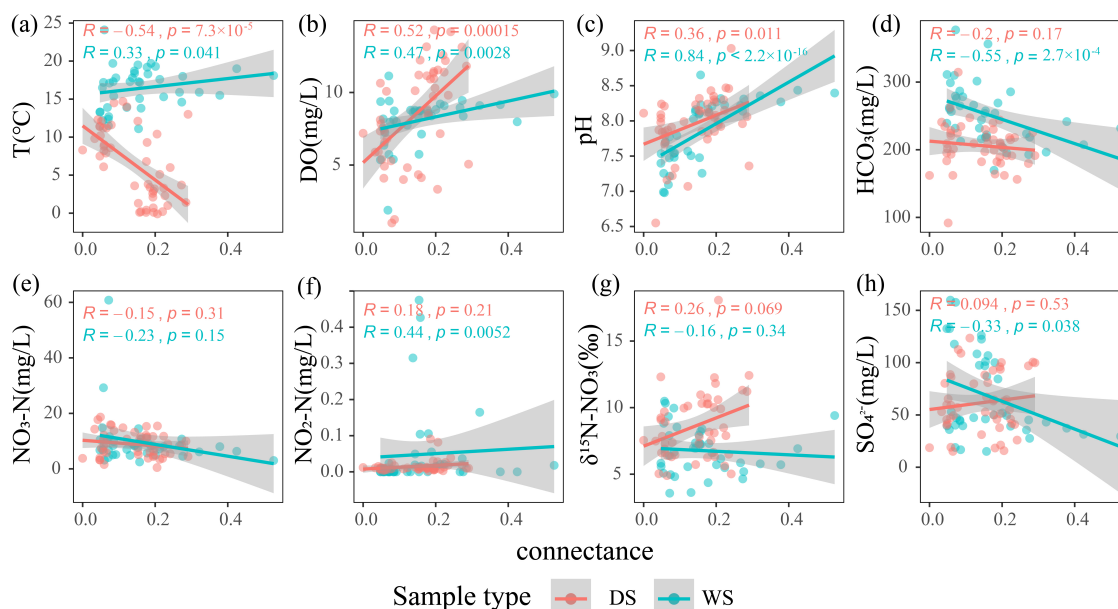


Figure S8. Correlations between network connectance and physicochemical variables: the relationship between connectance and (a) temperature (T); (b) dissolved oxygen (DO); (c) pH; (d) bicarbonate (HCO_3^-); (e) nitrate-N (NO_3^- -N); (f) nitrite-N (NO_2^- -N); (g) $\delta^{15}\text{N}$ - NO_3 ; (h) sulfate (SO_4^{2-}).

Table S1. Results of Wilcoxon tests for differences in α -diversity indices among groups.

	Shannon_p.	Richness_p	Simpson_p
DS_GW vs. DS_SED	3.77×10^{-7}	0.000000245	0.00000632
DS_GW vs. DS_SW	0.822	0.854	0.581
DS_GW vs. WS_GW	0.286	0.015	0.552
DS_GW vs. WS_SED	3.15×10^{-7}	0.0000057	0.000000164
DS_GW vs. WS_SW	0.009	0.049	0.008
DS_SED vs. DS_SW	7.80×10^{-9}	4.16×10^{-8}	0.0000112
DS_SED vs. WS_GW	1.12×10^{-9}	9.9×10^{-7}	0.00000217
DS_SED vs. WS_SED	0.822	0.049	0.14
DS_SED vs. WS_SW	5.19×10^{-5}	9.45×10^{-7}	0.006
DS_SW vs. WS_GW	0.008	0.000344	0.012
DS_SW vs. WS_SED	7.80×10^{-9}	6.55×10^{-8}	7.28×10^{-9}
DS_SW vs. WS_SW	3.00×10^{-6}	0.004	0.0000328
WS_GW vs. WS_SED	2.97×10^{-9}	2.55×10^{-8}	7.28×10^{-9}
WS_GW vs. WS_SW	4.41×10^{-8}	3.81×10^{-6}	7.95×10^{-7}
WS_SED vs. WS_SW	2.67×10^{-5}	0.0000508	0.0000181

Table S2. Coefficient of variation (CV) of α -diversity indices across different seasons and habitats.

	WS-SW	DS-SW	WS-GW	DS-GW	WS-SED	DS-SED
richness	0.22	0.31	0.44	0.49	0.24	0.18
shannon	0.09	0.13	0.18	0.29	0.09	0.10
simpson	0.01	0.03	0.07	0.11	0.008	0.02

Table S3. Results of Wilcoxon tests for differences between different sample types.

Type1	Type2	p.adj	p.adj.signif	Type1	Type2	p.adj	p.adj.signif
DS-GW	DS-SED	7.39×10^{-17}	****	DS-SED	WS-SW	1.30×10^{-22}	****
DS-GW	DS-SW	2.66×10^{-31}	****	DS-SW	WS-GW	0.195	ns
DS-GW	WS-GW	6.79×10^{-30}	****	DS-SW	WS-SED	1.07×10^{-5}	****
DS-GW	WS-SED	9.00×10^{-38}	****	DS-SW	WS-SW	3.06×10^{-10}	****
DS-GW	WS-SW	2.44×10^{-42}	****	WS-GW	WS-SED	0.005	**
DS-SED	DS-SW	1.46×10^{-6}	****	WS-GW	WS-SW	3.61×10^{-6}	****
DS-SED	WS-GW	4.95×10^{-8}	****	WS-SED	WS-SW	0.049	*
DS-SED	WS-SED	7.39×10^{-17}	****				

The meanings represented by different asterisks. **** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$.