





Figure S1. Comparison of vertical water temperature profiles between model simulations and observations at the buoy station in 2017 and 2018.

Table S1. Governing parameters, descriptions, values, and units adopted in the water quality-ecological model.

Symbol	Parameter	Value	Unit	Reference
K_deox	Deoxygenation rate	0.21	day ⁻¹	0.16-0.21 [58]
K_nitr	Nitrification rate	0.13	day ⁻¹	0.09-0.13 [58]
K_deni	Denitrification rate	0.05	day ⁻¹	0.09 [58]
K_mine1	Organic nitrogen mineralization	0.075	day ⁻¹	0.075 [58]
K_mine2	Organic phosphorus mineralization	0.15	day ⁻¹	0.22 [58]
KCOD	Half-saturation constant of dissolved oxygen required for oxidation of chemical oxygen demand	0.5	mg O ₂ L ⁻¹	0.5 [58]
KNITR	Nitrification half-saturation constant for dissolved oxygen	0.5	mg O ₂ L ⁻¹	0.5 [58]
KNO3	Denitrification half-saturation constant for dissolved oxygen	0.1	mg O ₂ L ⁻¹	0.1 [58]
KmN	Half-saturation constant for uptake of inorganic nitrogen	25.0	ug N L ⁻¹	25.0 [58]
KmP	Half-saturation constant for uptake of inorganic phosphorus	1.0	ug P L ⁻¹	1.0 [58]
SOD	Sediment oxygen demand	0.4	g O ₂ m ⁻² day ⁻¹	0.2-4.0 [58]
FON	Fraction of dead and respired phytoplankton recycled to the organic nitrogen	0.5	-	0.5 [58]
FOP	Fraction of dead and respired phytoplankton recycled to the organic phosphorus	0.65	-	0.5 [58]
Solar_S	Optimum solar radiation rate	250	langley's day ⁻¹	216-350 [55] 200-500 [58]
Ratio_NC	Ratio of nitrogen to carbon in phytoplankton	0.25	mg N mg ⁻¹ C ⁻¹	0.25 [58]
Ratio_PC	Ratio of phosphorus to carbon in phytoplankton	0.025	mg P mg ⁻¹ C ⁻¹	0.025 [58]
KB_ds	Organic carbon decomposition rate	0.01	day ⁻¹	0.004 [58]
Dep_ben	Benthic layer depth	0.5	m	0.2-0.7 [58]
GZ	Growth rate of zooplankton	0.76	day ⁻¹	0.1-0.7 [57] 0.1-0.76 [55]
BMZ	Basal metabolism rate of zooplankton	0.254	day ⁻¹	0.24-1.2 [55] 0.17 [56,59] 0.001-0.125
PRZ	Mortality rate of zooplankton	0.02	day ⁻¹	[55] 0.02 [59]
GP	Growth rate of phytoplankton	2.50	day ⁻¹	0.2-8.0 [55] 2.0 [58] 2.0-5.5 [56,59]

BMP	Basal metabolism rate of phytoplankton	0.01	day ⁻¹	0.003-0.17 [55] 0.02 [58] 0.01 [59]
PRP	Predation rate on phytoplankton	1.75	day ⁻¹	0.02-2.28 [60]
WS	Settling velocity of phytoplankton	0.01	m day ⁻¹	0.01-0.6 [55] 0.1 [58]
