

1 **Supporting Information**

2 **Fig. S1** Conceptual model identifying the expected direct and indirect pathways for
3 catchment land uses and local factors to affect sediment potential nitrification.

4 **Fig. S2** Relationships between sediment potential nitrification rate and nitrifying
5 community structure (N=35).

6 **Table S1** Water quality, sediment properties, and submerged vegetation
7 characteristics of 35 sampling sites belonging to 10 Yangtze lakes.

8 **Table S2** Pearson correlation coefficients between catchment land uses and local
9 water quality, sediment properties and submerged vegetation characteristics (N=35).

10 **Table S3** Sediment potential nitrification rate and nitrifying community structure of
11 35 sampling sites belonging to 10 Yangtze lakes.

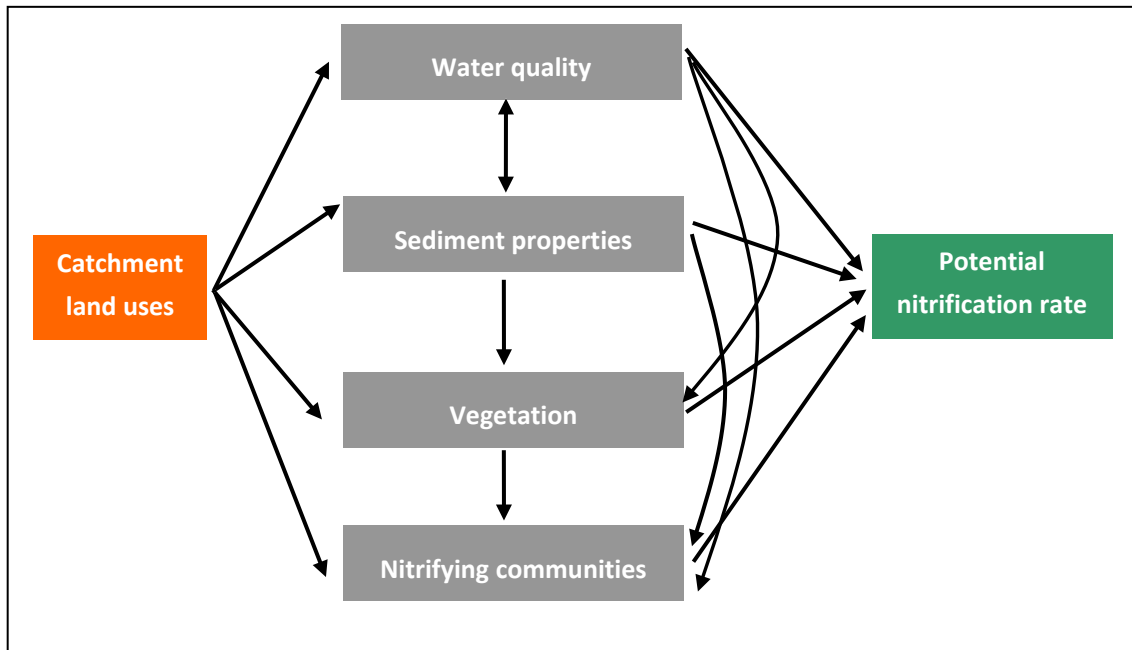


Fig. S1

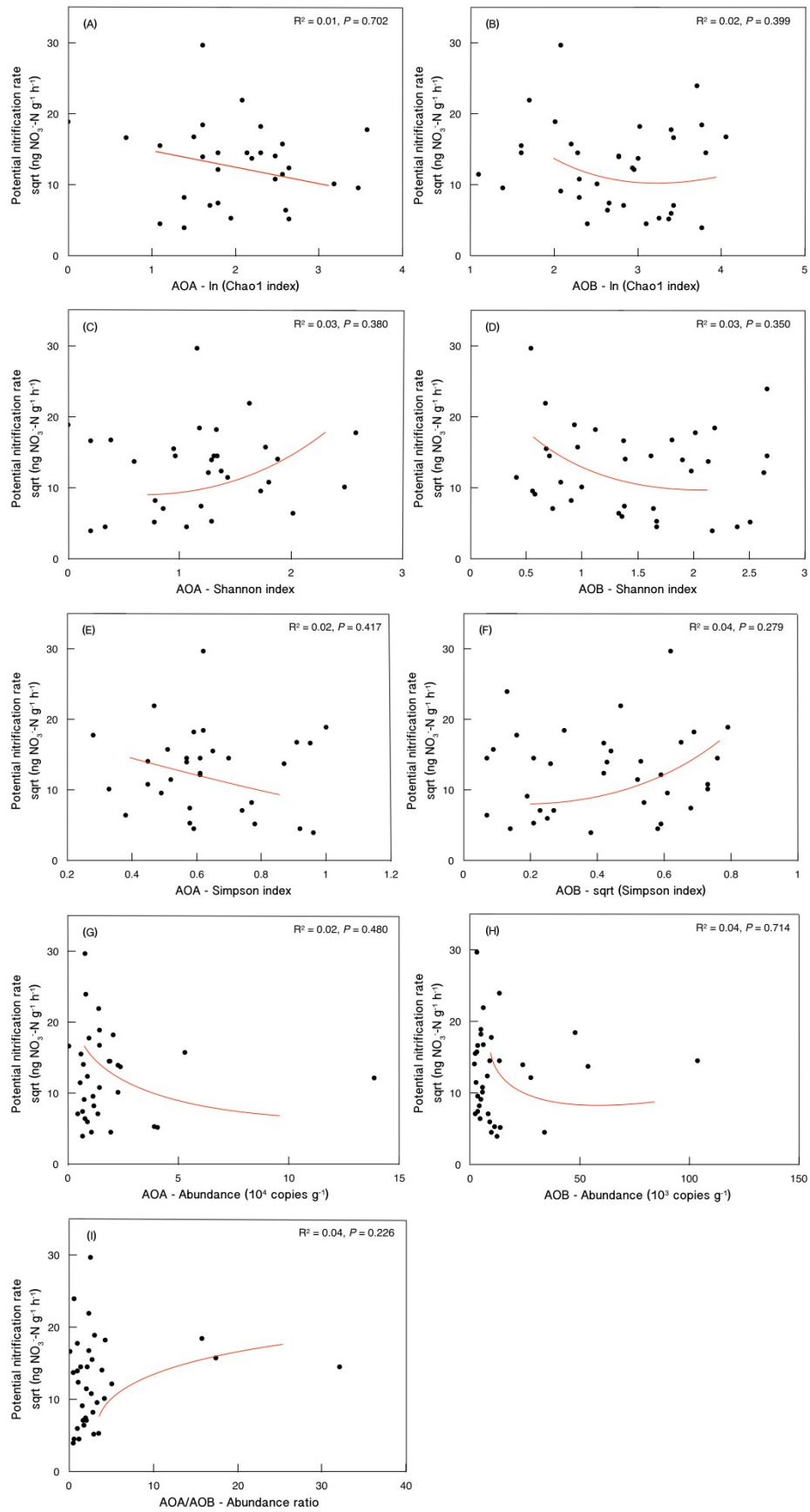


Fig. S2

Table S1 Water quality, sediment properties, and submerged vegetation characteristics of 35 sampling sites belonging to 10 Yangtze lakes.

	Depth (m)	SD (m)	TOC (mg L ⁻¹)	TN (mg L ⁻¹)	TP (mg L ⁻¹)	Chl- <i>a</i> (mg m ⁻³)	TSI	Moisture (%)	Density (g cm ⁻³)	STC (mg g ⁻¹)	STN (mg g ⁻¹)	NH ₄ ⁺ (mg kg ⁻¹)	NO ₃ ⁻ (mg kg ⁻¹)	Richness	Biomass (g m ⁻²)
BJH1	2.00	0.20	7.97	0.70	0.13	74.97	76.74	56.00	1.35	20.90	1.68	0.6	0.35	0	0
BJH2	2.50	0.20	6.15	1.59	0.15	78.77	77.71	62.08	1.25	25.50	2.10	0.63	0.36	0	0
BJH3	2.00	0.20	7.20	0.56	0.10	69.36	75.16	57.60	1.50	12.70	1.30	0.82	0.14	0	0
CH1	2.80	1.00	5.22	0.57	ND	10.21	56.68	70.89	1.05	11.60	1.18	0.92	0.13	2	469
CH2	3.50	1.10	4.90	1.34	0.00	ND	41.91	63.62	1.17	13.90	1.29	1.02	0.37	3	839
CH3	2.00	1.20	5.52	1.13	ND	5.76	52.56	73.32	1.14	28.40	1.40	0.65	0.08	3	195
CH4	3.50	1.10	6.25	1.06	ND	11.72	56.67	77.44	1.42	35.20	1.51	0.81	0.04	1	613
DH1	1.70	0.30	7.14	1.23	0.18	45.54	74.86	46.39	1.39	26.50	1.66	0.57	0.3	0	0
DH2	4.00	0.20	10.93	0.92	0.40	63.15	81.69	55.82	1.52	25.70	1.58	1.22	1.8	0	0
DH3	2.20	0.40	8.03	1.72	0.51	50.37	78.80	67.87	1.34	60.40	3.55	0.89	0.77	0	0
DSH1	2.00	0.50	7.78	2.13	0.15	12.26	67.09	57.88	1.31	8.80	1.21	2.31	0.28	0	0
DSH2	3.20	0.40	7.70	2.11	0.14	15.46	68.53	53.19	1.42	9.10	1.20	0.61	0.71	0	0
DSH3	2.80	0.90	8.86	1.08	0.22	2.11	60.38	70.90	1.48	8.80	.98	0.57	0.49	0	0
GCH1	1.90	0.90	7.45	0.79	0.04	10.95	57.52	64.27	1.17	26.30	2.09	0.98	0.05	4	665
GCH2	3.00	1.00	7.52	1.08	0.02	22.75	56.98	71.21	1.07	26.00	2.23	0.75	1.66	2	70
GCH3	2.60	0.90	7.72	1.19	0.03	33.24	60.09	71.95	1.31	14.40	1.43	0.66	0.25	2	1019
GCH4	1.80	0.80	7.08	0.96	0.03	24.14	59.61	64.81	1.18	17.00	1.78	0.71	0.11	5	733
HOH1	2.00	1.40	7.61	0.84	0.00	19.65	46.71	73.88	1.17	52.20	4.21	0.84	0.14	4	1858
HOH2	2.10	1.50	7.43	0.83	0.00	19.80	46.40	65.20	1.08	56.90	3.84	1.9	0.06	3	2640
HOH3	2.20	1.20	8.15	0.72	0.00	16.51	36.03	66.85	1.06	35.80	2.11	0.89	ND	4	818

H0H4	1.50	1.10	7.96	0.82	0.02	11.16	52.29	73.46	1.26	35.40	2.19	0.92	0.23	4	1380
HUH1	1.60	0.60	6.28	1.05	0.14	17.38	66.96	57.77	1.38	16.40	1.09	0.86	0.54	0	0
HUH2	1.50	0.60	6.19	1.29	0.19	46.90	71.72	48.38	1.47	22.30	2.10	0.7	0.24	0	0
HUH3	2.00	0.70	6.57	1.03	0.22	34.94	70.93	59.31	1.39	24.00	2.16	0.68	0.17	0	0
JSH1	3.20	0.45	3.92	0.64	0.06	31.96	66.29	57.30	1.34	5.60	1.00	0.83	0.07	0	0
JSH2	2.60	0.60	3.67	0.63	0.04	11.76	59.20	55.32	1.43	11.90	1.63	0.63	0.33	0	0
JSH3	2.20	0.65	3.94	0.68	0.04	15.46	60.21	59.08	1.28	12.60	1.63	1.3	1.54	0	0
TH1	1.30	1.00	5.53	0.79	0.02	6.50	52.89	72.79	1.27	11.90	1.24	0.91	2.35	5	1182
TH2	1.30	1.20	6.11	1.16	0.03	2.88	50.71	63.34	1.18	11.10	1.35	0.7	0.29	7	957
TH3	1.10	1.10	5.61	0.98	0.01	1.38	44.12	72.20	1.06	10.10	1.15	0.73	0.11	6	2375
TH4	1.20	1.00	5.72	0.87	0.01	2.67	44.87	76.37	1.15	13.50	1.56	0.8	0.12	5	1595
XLH1	2.00	1.90	5.63	0.70	0.04	16.52	55.27	70.75	1.13	60.40	4.36	1.18	0.47	6	1050
XLH2	2.10	1.30	6.46	0.51	0.03	26.60	56.96	56.97	1.05	104.20	6.03	0.59	0.39	4	284
XLH3	2.20	1.00	5.89	0.57	0.03	31.16	58.74	70.68	1.02	83.70	6.29	1.01	1.63	3	1668
XLH4	1.80	1.50	6.40	0.54	0.04	19.19	56.40	78.72	1.05	48.50	3.42	0.91	0.81	3	385

BJH: Lake Bajiaohu; CH: Lake Cihu; DH: Lake Donghu; DSH: Lake Dianshanhu; GCH: Lake Guchenghu; H0H: Lake Honghu; HUH: Lake Huahu; JSH: Lake Junshanhu; TH: Lake Taihu (East Taihu); XLH: Lake Xilianghu.

ND: no data; See Table 1 for the abbreviations.

Table S2 Pearson correlation coefficients between catchment land uses and local water quality, sediment properties and submerged vegetation characteristics (N=35).

	Catchment agriculture	Catchment built-up land	Catchment vegetation
Depth	0.16	-0.22	0.02
SD	-0.04	-0.27	0.03
TOC	0.63**	0.10	-0.41*
TN	0.42*	0.45**	-0.27
TP	0.34	0.11	-0.06
Chl- <i>a</i>	-0.02	-0.31	0.10
TSI	-0.07	0.12	0.10
Moistur	0.02	-0.11	0.05
Density	0.15	0.30	-0.17
STC	0.12	-0.60**	0.06
STN	-0.12	-0.43**	0.07
NH ₄ ⁺	0.24	0.02	-0.31
NO ₃ ⁻	-0.13	0.13	0.08
Richness	-0.09	-0.05	0.14
Biomass	0.16	-0.09	-0.16

* $P < 0.05$; ** $P < 0.01$; See Table 1 for the abbreviations.

Table S3 Sediment potential nitrification rate and nitrifying community structure of 35 sampling sites belonging to 10 Yangtze lakes.

	AOA				AOB				AOA/AOB	
	Potential nitrification rate (ng NO ₃ ⁻ -N g ⁻¹ h ⁻¹)	Chao1	Shannon	Simpson	Abundance (10 ⁴ copies g ⁻¹)	Chao1	Shannon	Simpson	Abundance (10 ⁴ copies g ⁻¹)	Abundance ratio
BJH1	209.3	8.50	1.34	0.33	333.34	45.00	2.66	0.10	10.37	32.15
BJH2	339.7	5.00	1.18	0.38	75.13	43.50	2.19	0.14	4.77	15.74
BJH3	145.7	6.00	1.26	0.37	13.87	19.25	2.63	0.07	2.75	5.04
CH1	27.5	7.00	1.29	0.33	3.90	26.00	1.67	0.30	1.11	3.52
CH2	101.0	24.00	2.48	0.11	2.28	12.33	1.00	0.59	0.55	4.17
CH3	20.2	3.00	1.06	0.34	1.07	11.00	1.67	0.21	0.95	1.12
CH4	82.6	ND	ND	ND	0.73	8.00	0.58	0.73	0.49	1.51
DH1	187.6	9.00	0.59	0.75	2.39	20.00	2.13	0.14	5.36	0.45
DH2	192.5	5.00	1.29	0.32	2.26	16.00	1.90	0.19	2.40	0.94
DH3	210.5	6.00	0.96	0.49	1.85	9.75	1.62	0.26	1.32	1.40
DSH1	54.7	6.00	1.19	0.34	0.64	14.33	1.38	0.43	0.32	1.99
DSH2	153.4	14.00	1.37	0.37	0.87	19.00	1.98	0.21	0.78	1.11
DSH3	49.5	5.50	0.85	0.55	0.45	17.00	0.74	0.68	0.22	2.02
GCH1	275.6	2.00	0.20	0.90	0.02	31.00	1.37	0.42	0.35	0.06
GCH2	49.5	ND	ND	ND	1.36	31.00	1.64	0.27	0.81	1.67
GCH3	41.2	13.50	2.02	0.15	0.75	14.00	1.33	0.42	0.43	1.74
GCH4	315.4	36.00	2.58	0.08	0.96	30.00	2.02	0.23	0.96	1.00
HOH1	571.4	ND	ND	ND	0.79	41.00	2.66	0.07	1.32	0.60
HOH2	15.7	4.00	0.20	0.92	0.64	43.50	2.17	0.16	1.22	0.52

HOH3	20.6	3.00	0.33	0.84	1.93	22.14	2.39	0.13	3.36	0.57
HOH4	35.2	ND	ND	ND	0.87	30.00	1.36	0.38	0.90	0.97
HUH1	66.9	4.00	0.78	0.59	1.16	10.00	0.90	0.58	0.41	2.85
HUH2	277.8	4.50	0.38	0.84	1.41	58.00	1.81	0.25	0.60	2.35
HUH3	355.0	1.00	0.00	1.00	1.41	7.50	0.93	0.54	0.47	3.03
JSH1	116.1	12.00	1.80	0.20	1.44	10.00	0.81	0.65	0.56	2.59
JSH2	132.0	13.00	1.43	0.27	0.54	3.00	0.41	0.79	0.26	2.05
JSH3	90.3	32.00	1.73	0.24	1.14	4.00	0.56	0.73	0.35	3.30
TH1	246.3	13.00	1.77	0.26	5.30	9.00	0.96	0.52	0.30	17.43
TH2	239.5	3.00	0.95	0.42	0.59	5.00	0.68	0.61	0.22	2.72
TH3	26.6	14.00	0.77	0.60	4.05	29.00	2.51	0.09	1.37	2.96
TH4	197.6	12.00	1.88	0.20	0.68	16.00	1.39	0.44	0.17	3.91
XLH1	210.0	10.00	1.31	0.37	1.90	5.00	0.71	0.59	0.90	2.12
XLH2	331.4	10.00	1.33	0.35	2.03	20.50	1.12	0.53	0.47	4.30
XLH3	876.4	5.00	1.16	0.38	0.77	8.00	0.54	0.76	0.31	2.52
XLH4	478.8	8.00	1.63	0.22	1.38	5.50	0.67	0.69	0.59	2.33

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