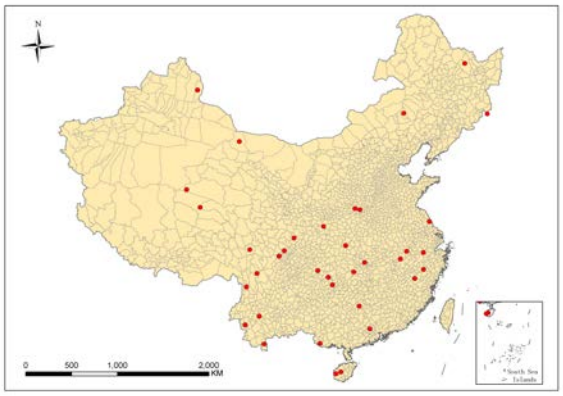
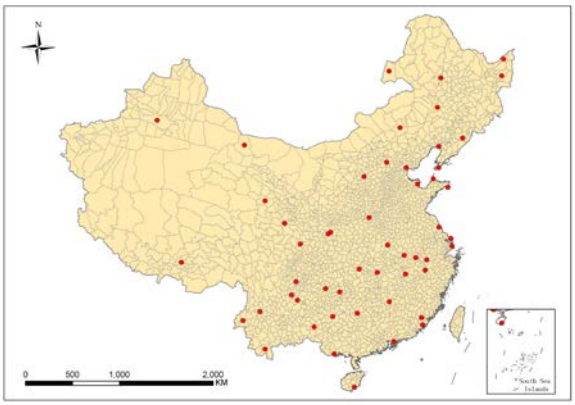
Supplementary Information for

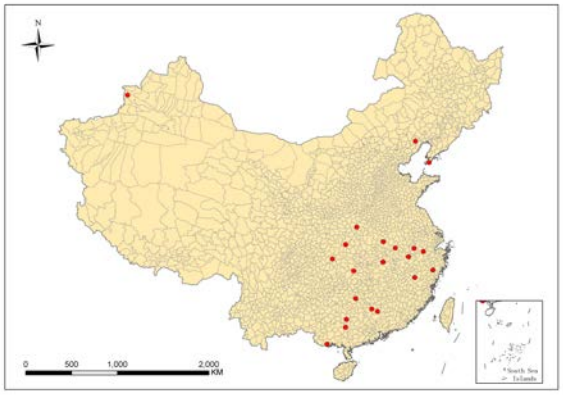
Optimized Monitoring Sites for Detection of Biodiversity Trends in China



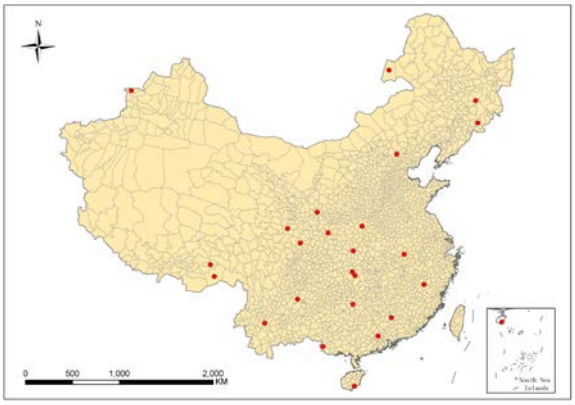
Mammals



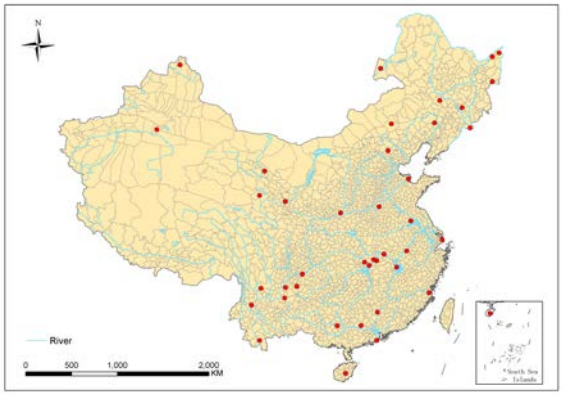
Birds



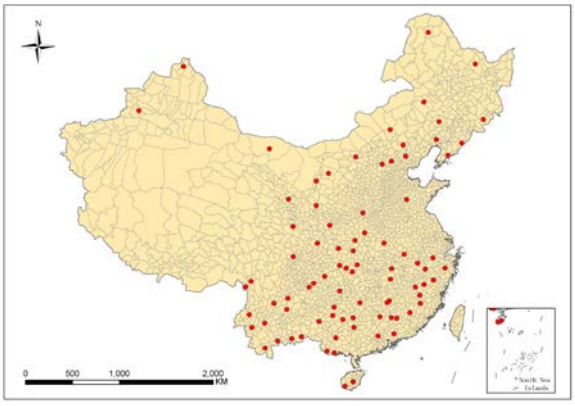
Reptiles



Amphibians

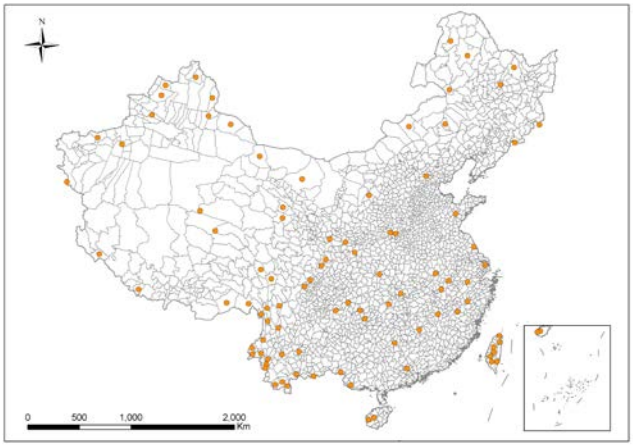


Inland water fishes

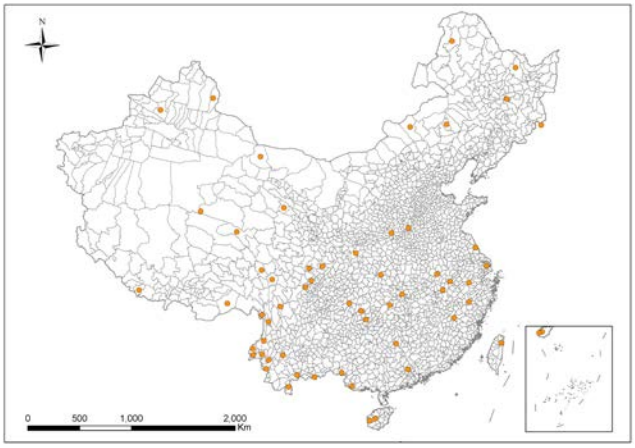


Vascular plants

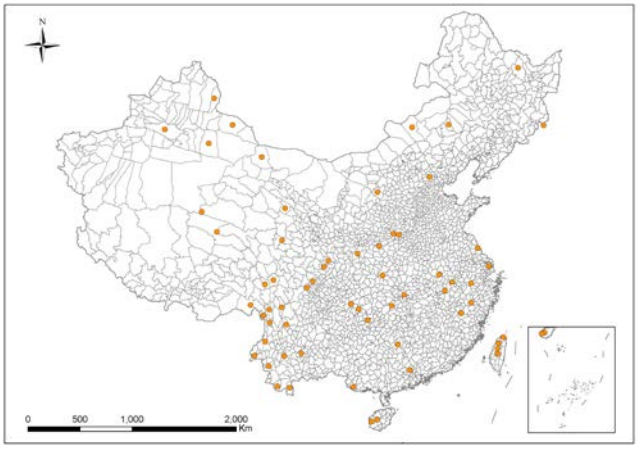
Figure S1. Essential sites for monitoring of different taxa. Essential sites for monitoring were selected based on nature reserves' conservation targets, regional distribution and monitoring capacity.



All mammal species

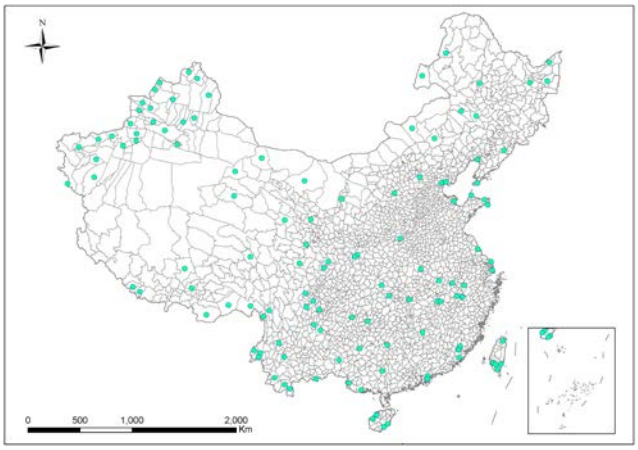


Threatened mammal species

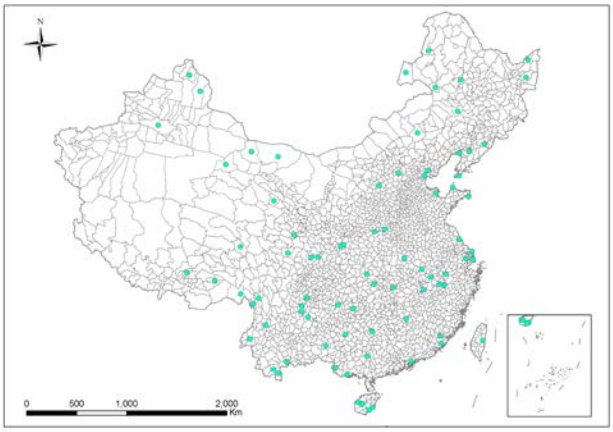


Mammal species endemic to China

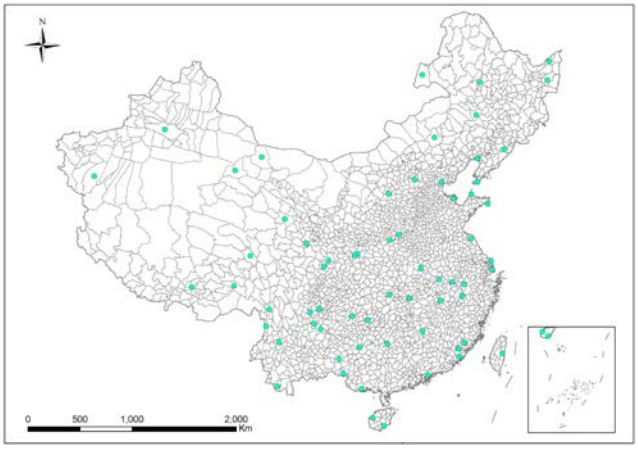
Figure S2. Monitoring sites for mammals generated by complementarity analysis covering 100% of mammal species and keeping 100 km apart between any two sites



All bird species

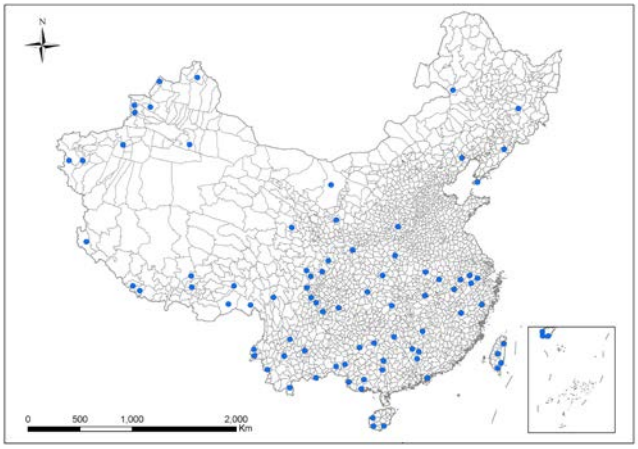


Threatened bird species

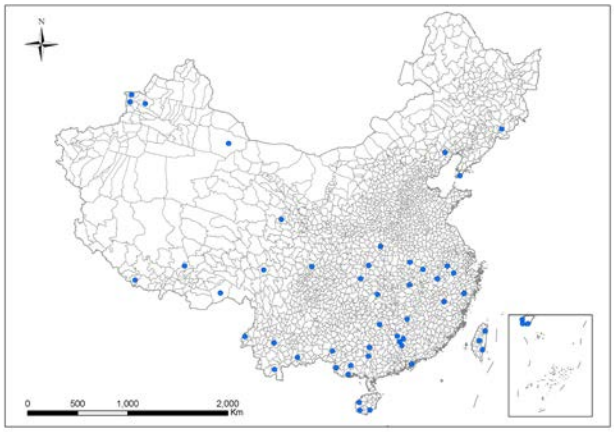


Bird species endemic to China

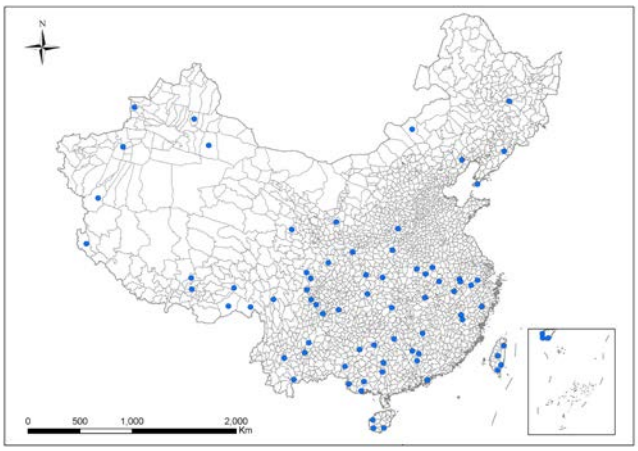
Figure S3. Monitoring sites for birds generated by complementarity analysis covering 100% of bird species and keeping 100 km apart between any two sites



All reptile species

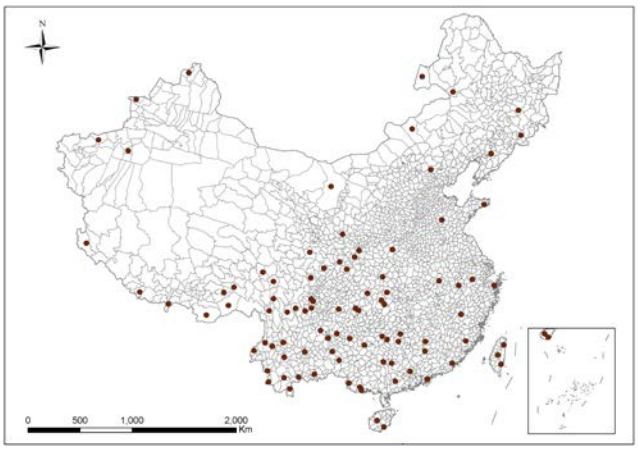


Threatened reptile species

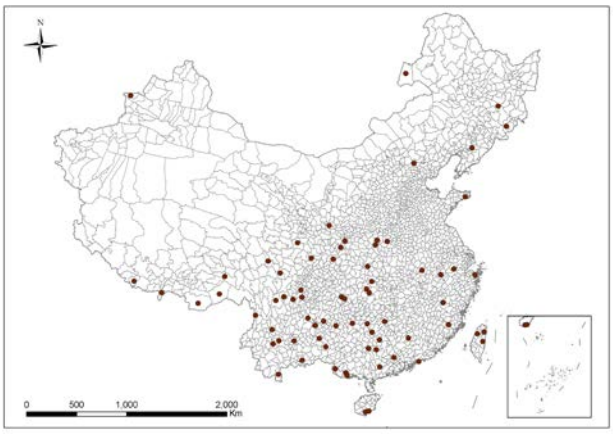


Reptile species endemic to China

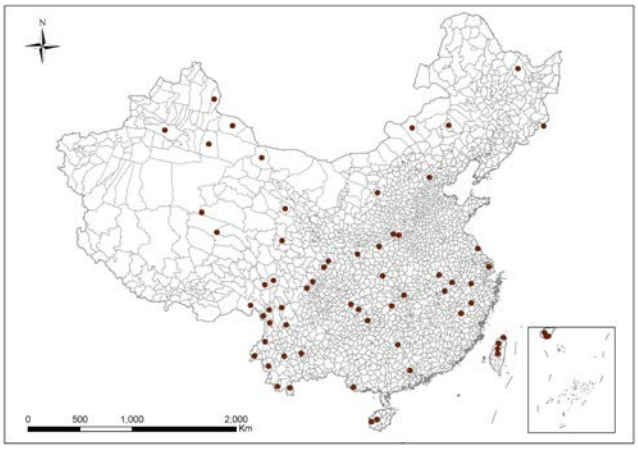
Figure S4. Monitoring sites for reptiles generated by complementarity analysis covering 100% of reptile species and keeping 100 km apart between any two sites (for species endemic to China, the distance is 50 km)



All amphibian species

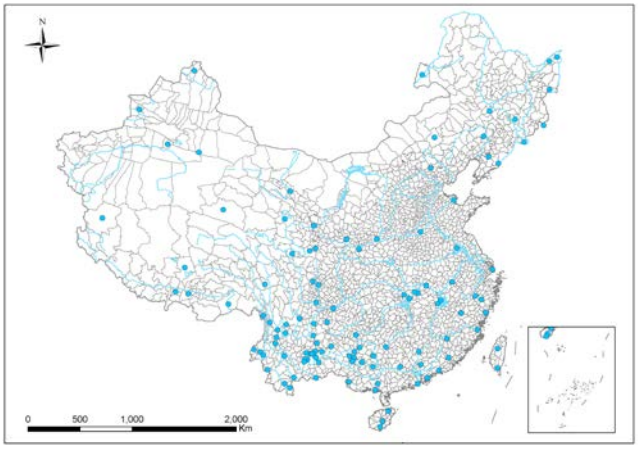


Threatened amphibian species

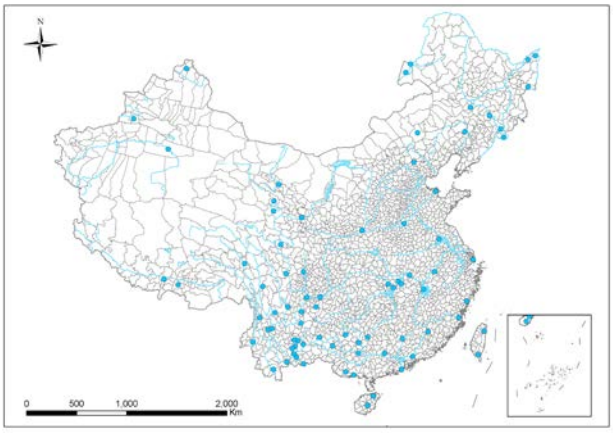


Amphibian species endemic to China

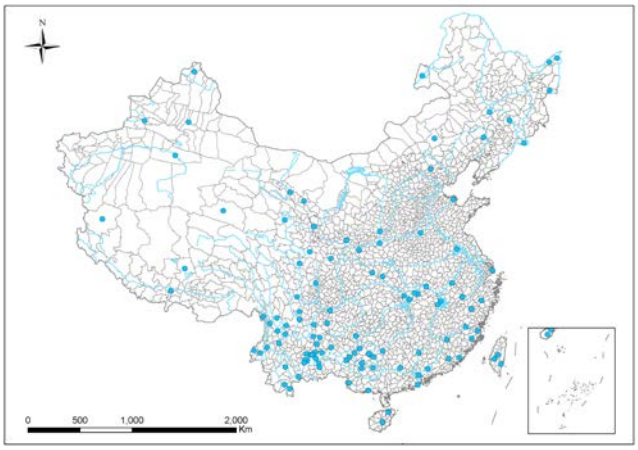
Figure S5. Monitoring sites for amphibians generated by complementarity analysis covering 100% of amphibian species and keeping 100 km apart between any two sites (for threatened species and species endemic to China, the distance is 50 km)



All inland water fish species

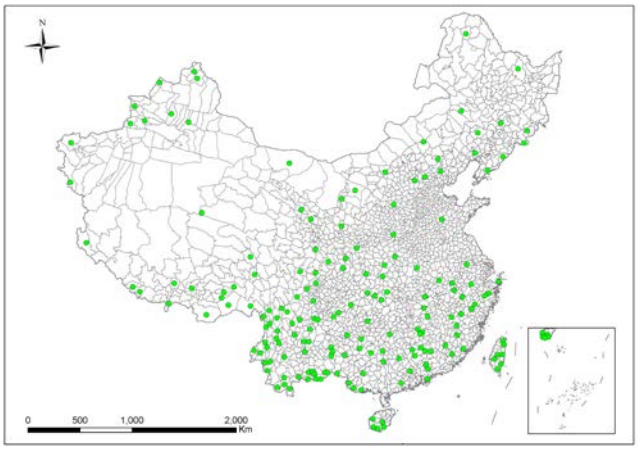


Threatened inland water fish species

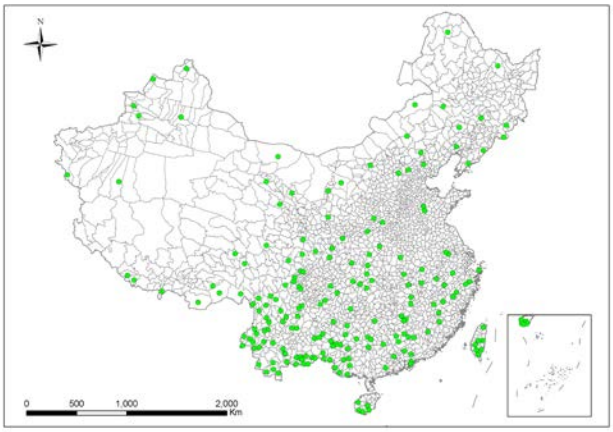


Inland water fish species endemic to China

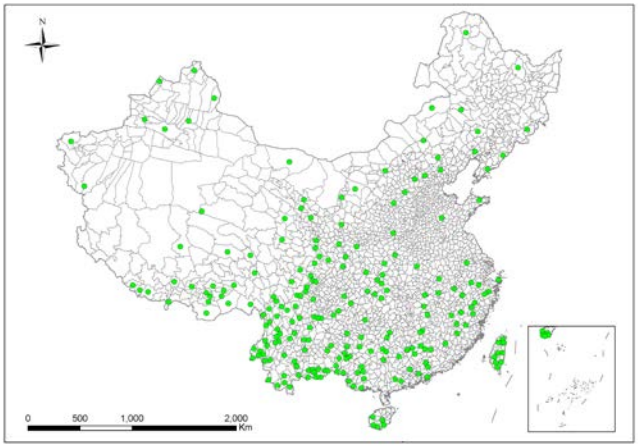
Figure S6. Monitoring sites for inland water fishes generated by complementarity analysis covering 90% **of inland water fish species and keeping 100 km apart between any two sites**



All vascular plant species

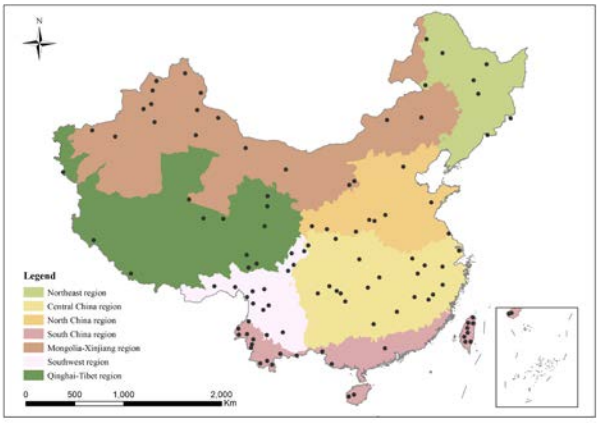


Threatened vascular plant species

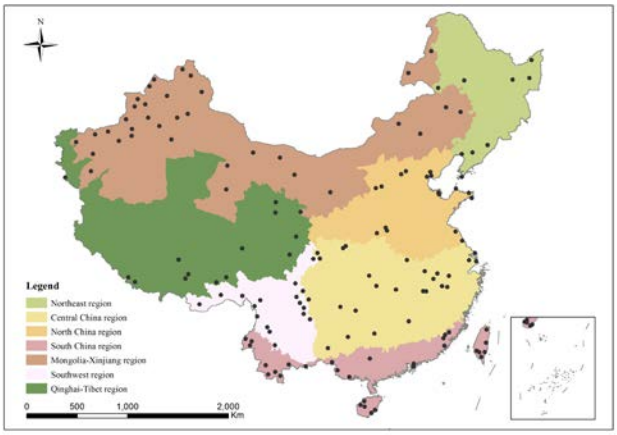


Vascular plant species endemic to China

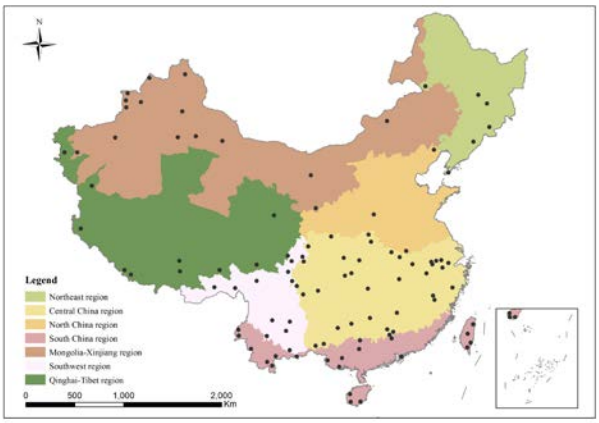
Figure S7. Monitoring sites for vascular plants generated by complementarity analysis covering 90% of vascular plant species and keeping 50 km apart between any two sites



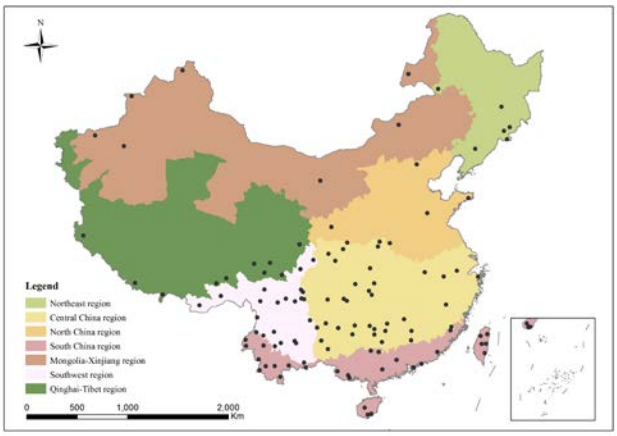
Mammals



Birds



Reptiles



Amphibians

Figure S8. Distribution of optimized monitoring sites for vertebrates within zoogeographical regions.

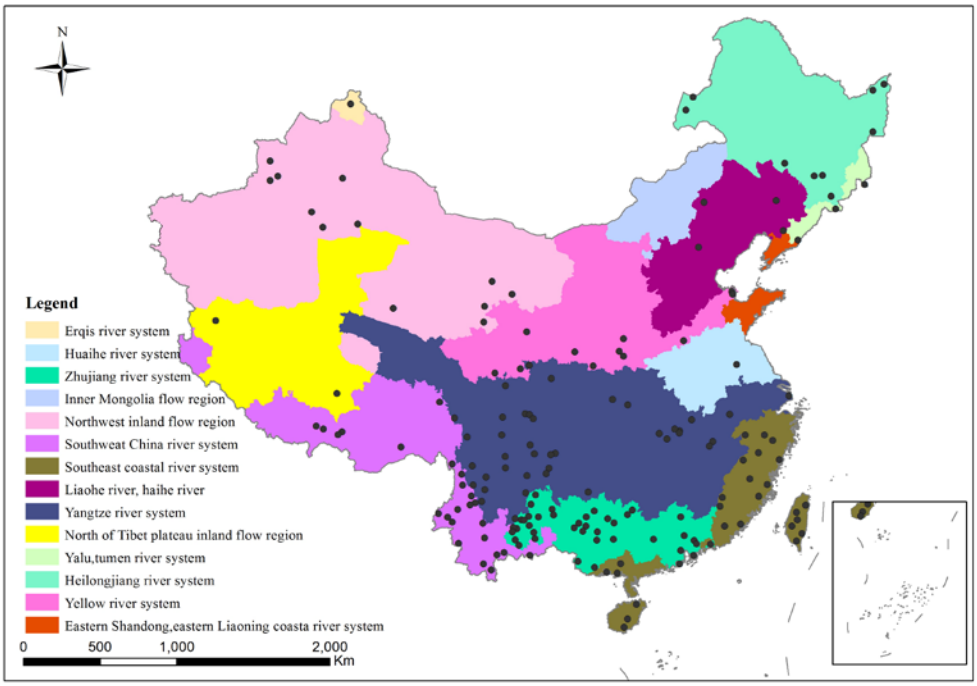


Figure S9. Distribution of optimized monitoring sites for inland water fishes within watersheds.

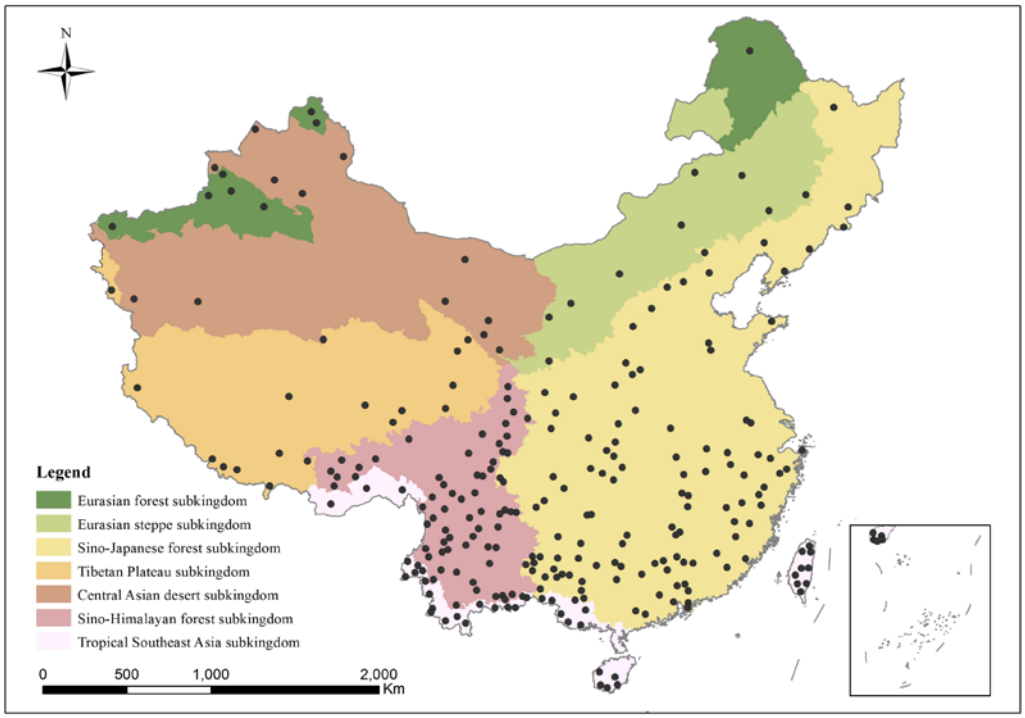


Figure S10. Distribution of optimized monitoring sites for vascular plants within phytogeographic regions.

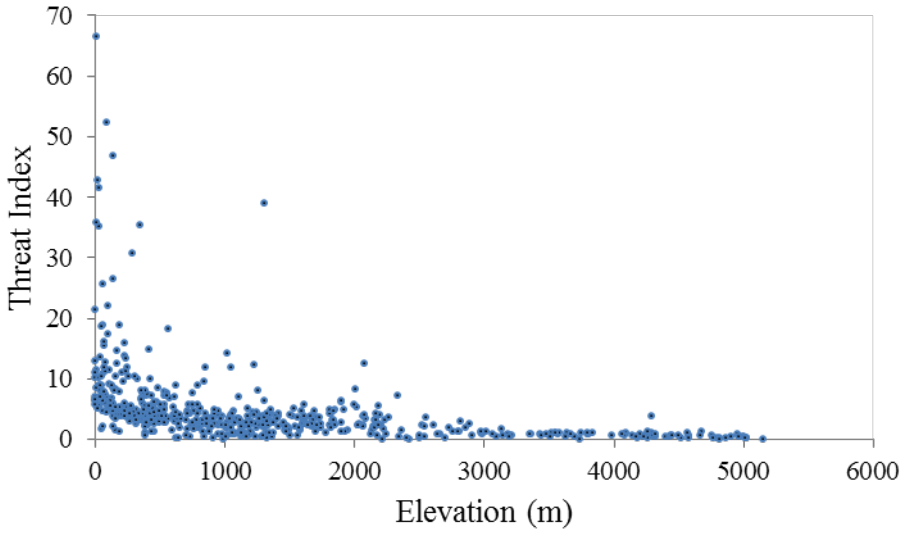


Figure S11. Distribution of Threat Index of the 564 proposed monitoring sites. We used the data on population density, GDP density and road density to represent major threats to biodiversity. Each indicator was normalized separately to the range of 0–100. The average value of the three normalized indicators was expressed as the value of Threat Index (TI) for each county. The mean TI was 6.56 for 2376 counties across the whole country. The mean TI for 564 proposed monitoring sites in this study was 4.64, which was obviously larger than that (3.81) of 246 counties where 196 essential nature reserves were distributed. Among the 564 proposed monitoring sites, 98 monitoring sites' TI exceeded the average national level of 6.56, and 230 monitoring sites' TI exceeded 3.81 in the essential nature reserves. Moreover, the mean values of population density, GDP density and road density for 2376 counties were 440.43 people/km^2, 1788.64 ten thousand yuan/km^2, and 278.70 m/km^2, respectively. 75, 62, and 107 monitoring sites showed a higher level than mean values for 2376 counties respectively in terms of population density, GDP density and road density. Population density, GDP density or road density in half of the monitoring sites exceeded 114.57 people/km^2, 158.93 ten thousand yuan/km^2, and 173.61 m/km^2, respectively. Therefore, we consider that the gradient of stressors has been relatively well addressed within the proposed monitoring network.

Table S1 Number of monitoring sites for mammals calculated by complementarity analysis under different distance and species coverage scenarios

Distance (km)	Species coverage (%)			
	90	**95**	**98**	**100**
		All species		
0	55	66	78	89
50	56	66	79	90
100	56	66	79	92
150	56	66	80	94
200	56	67	81	103
250	56	67	82	-*
300	56	68	85	-
		Threatened species		
0	42	48	52	55
50	42	48	52	55
100	42	48	53	57
150	42	49	53	57
200	42	49	53	59
250	42	49	54	64
300	45	51	56	69
		Species endemic to China		
0	48	54	58	60
50	48	54	58	61
100	48	54	58	61
150	48	54	58	64
200	49	55	62	68
250	50	55	63	69
300	50	56	82	93

*Note: - no solution, the same as below.

Table S2 Number of monitoring sites for birds calculated by complementarity analysis under different distance and species coverage scenarios

Distance (km)	Species coverage (%)			
	90	**95**	**98**	**100**
All species				
0	69	76	92	118
50	69	76	92	120
100	69	76	94	121
150	69	77	96	128
200	69	78	97	134
250	69	79	103	-
300	69	84	-	-
Threatened species				
0	64	70	75	77
50	64	70	75	77
100	65	72	78	81
150	66	71	77	80
200	67	75	82	86
250	68	78	91	99
300	71	81	96	-
Species endemic to China				
0	57	61	63	64
50	57	61	63	64
100	58	61	63	64
150	58	61	63	64
200	58	61	64	65
250	60	65	71	87
300	59	65	74	86

Table S3 Number of monitoring sites for reptiles calculated by complementarity analysis under different distance and species coverage scenarios

Distance (km)	Species coverage (%)			
	90	**95**	**98**	**100**
		All species		
0	50	60	72	79
50	50	60	72	79
100	50	60	72	81
150	50	61	74	85
200	50	61	75	85
250	51	64	82	137
300	51	65	86	-
		Threatened species		
0	36	42	46	48
50	36	42	46	48
100	36	42	46	48
150	36	42	46	48
200	37	43	48	51
250	38	44	56	60
300	38	44	49	55
		Species endemic to China		
0	50	59	64	67
50	51	60	65	72
100	52	61	67	-
150	52	62	70	-
200	53	62	68	-
250	54	66	93	-
300	56	67	174	-

Table S4 Number of monitoring sites for amphibians calculated by complementarity analysis under different distance and species coverage scenarios

Distance (km)	Species coverage (%)			
	90	**95**	**98**	**100**
	All species			
0	51	69	80	87
50	51	69	80	87
100	53	70	82	93
150	53	70	82	98
200	53	71	85	99
250	56	75	96	116
300	57	75	88	-
	Threatened species			
0	52	60	65	68
50	52	60	65	72
100	52	60	66	-
150	51	59	67	-
200	52	62	69	-
250	54	65	74	-
300	55	63	75	-
	Species endemic to China			
0	59	70	77	81
50	59	70	78	83
100	60	71	79	-
150	60	72	86	-
200	61	79	97	-
250	65	81	112	-
300	65	81	107	-

Table S5 Number of monitoring sites for inland water fishes calculated by complementarity analysis under different distance and species coverage scenarios

Distance (km)	Species coverage (%)			
	90	**95**	**98**	**100**
All species				
0	109	146	181	203
50	109	149	182	-
100	112	153	188	-
150	115	163	208	-
200	124	177	-	-
250	139	266	-	-
300	159	-	-	-
Threatened species				
0	72	81	86	89
50	73	82	87	93
100	78	88	-	-
150	78	89	-	-
200	83	97	-	-
250	87	117	-	-
300	105	139	-	-
Species endemic to China				
0	110	141	162	175
50	111	142	163	193
100	111	142	166	-
150	115	147	179	-
200	126	162	200	-
250	138	201	-	-
300	165	-	-	-

Table S6 Number of monitoring sites for vascular plants calculated by complementarity analysis under different distance and species coverage scenarios

Distance (km)	Species coverage (%)			
	90	**95**	**98**	**100**
	All species			
0	177	276	448	840
50	177	276	449	871
100	178	276	448	-
150	182	281	468	-
200	192	307	-	-
250	210	-	-	-
300	-	-	-	-
	Threatened species			
0	192	265	360	426
50	193	266	360	432
100	194	268	362	477
150	201	279	373	577
200	208	358	506	-
250	216	-	-	-
300	-	-	-	-
	Species endemic to China			
0	224	341	516	548
50	224	341	516	-
100	225	342	517	-
150	229	346	527	-
200	241	393	-	-
250	267	-	-	-
300	-	-	-	-