

supplementary material

Table S1. Data description and sources used.

Data	Description and resolution	Source	Time	Used in
Climate data	Temperature			PLUS
	Precipitation	https://www.resdc.cn/	1960-2020	PLUS/InVEST (Water Yield)
	Potential Evapotranspiration	https://data.tpdac.ac.cn/	1901-2022	InVEST (Water Yield)
Soil data	Plant Available Water Capacity (PAWC)	https://www.fao.org/	2023	InVEST (Water Yield)
Land use data	The maximum rooting depth of the soil (DTB)	globalchange.bnu.edu.cn/research/cdtb.jsp		
	Land use/land cover change (LUCC)	https://doi.org/10.5194/essd-2021-7	1985-2020	PLUS/InVEST
Elevation data	digital elevation model (DEM)	https://www.gscloud.cn/	2020	
Social Economic Data	Population density			
	Gross Domestic Product (GDP)	https://www.resdc.cn/	1990-2020	
	Water system			PLUS
		(https://www.webmap.cn/	2019	
	Road vector data			

Table S2. Biophysical table of water yield

Description	lucode	root_depth	Kc	LULC_veg
cropland	1	1000	1.1	1
forest	2	5200	0.95	1
grassland	3	2300	0.85	1
water	4	100	1	0
unused	5	300	0.2	1
construction land	6	100	0.2	0

lucode is the land use type code; root_depth is the plant root depth (mm); Kc is coefficient of vaporization; LULC_veg is an attribute category that determines 0 and 1 based on whether there is vegetative cover, with 1 being vegetative cover and 0 being no vegetative cover.

Table S3. Biophysical table of sediment delivery

Description	lucode	usle_c	usle_p
cropland	1	0.2	0.35
forest	2	0.05	1
grassland	3	0.3	1
water	4	0	0
unused	5	1	0
construction land	6	0	0.01

lucode is the land use type code; usle_c is the vegetation cover management factor; usle_p is the soil and water conservation measure factor.

Table S4. Table of threat factors data

THREAT	MAX_DIST	WEIGHT	DECAY
crp	7	0.7	linear
urb	10	1	exponential
unused	3	0.3	linear
road	4	0.5	linear

THREAT is the threat factor; MAX_DIST is the maximum threat distance (km); WEIGHT is the effect of each threat on habitat integrity as a relative value to other threats, with weights ranging from 0 to 1; DECAY indicate the type of degradation caused by the threat.

Table S5. Table of habitat sensitivity parameters

lucode	LULC_Name	HABITAT	crp	urb	unused	road
1	cropland	0.5	0.2	0.9	0.5	0.3
2	forest	1	0.5	0.8	0.2	0.6
3	grassland	0.9	0.2	0.5	0.3	0.6
4	water	1	0.4	0.6	0.5	0.5
5	unused	0.1	0.1	0.3	0.2	0.4
6	urban	0	0	0	0	0

lucode is the land use type code; HABITAT indicates the degree of habitat suitability for each class, ranging from 0 to 1, with higher values indicating better habitat suitability and the opposite being worse; crp, urb, unused, and road are the relative sensitivities of different land use types to each threat type, where 1 indicates high sensitivity and 0 indicates no impact.

Table S6. Above ground, below ground, soil, dead organic matter carbon stocks

lucode	LULC_Name	C_above	C_below	C_soil	C_dead
1	cropland	2.9	3.44	76.6	1.24
2	forest	30.89	9.12	107.82	2.48
3	grassland	0.49	4.29	75.54	0.22
4	water	0.64	0.45	0	0
5	unused	0.45	0.87	38.55	0
6	construction land	2.26	1.45	0	0

lucode is the land use type code; C_above, C_below, C_soil, and C_dead are carbon densities of aboveground, belowground, soil organic matter, and dead organic matter, respectively.