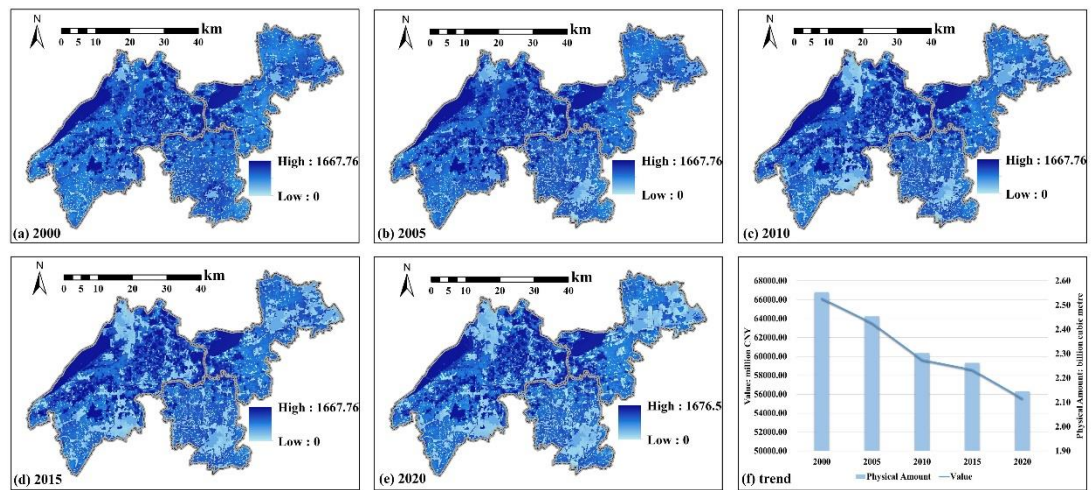**Supplementary materials**

Fig. S1. Spatial Distribution and Trend of Water Conservation Services from 2000 to 2020. (a), (b), (c), (d) and (e)

represent the spatial distribution of water conservation in 2000, 2005, 2010, 2015 and 2020, respectively. (f)

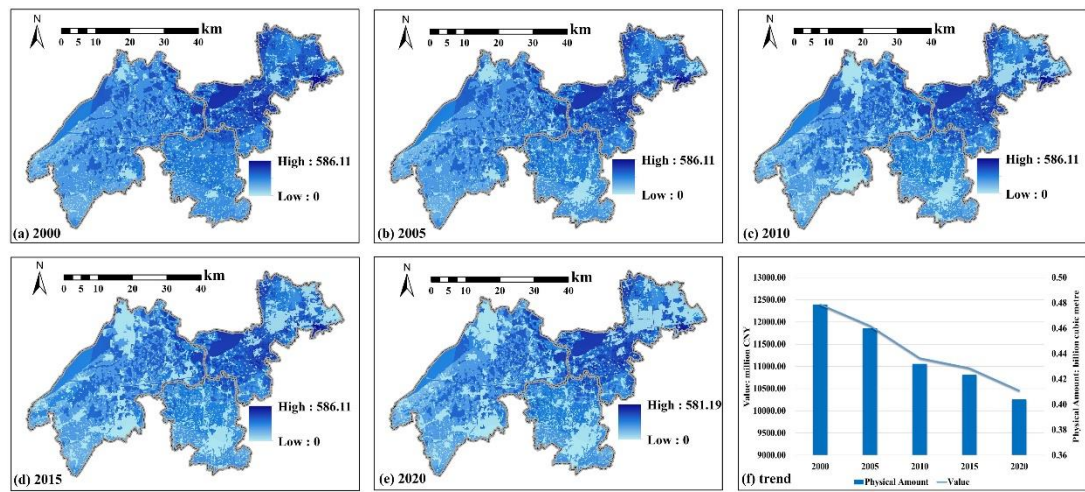characterizes trends in water conservation over a 20-year period.

Fig. S2. Spatial Distribution and Trend of Stormwater Runoff Regulation Services from 2000 to 2020. (a), (b), (c),

(d) and (e) represent the spatial distribution of stormwater runoff regulation in 2000, 2005, 2010, 2015 and 2020,

respectively. (f) characterizes trends in stormwater runoff regulation over a 20-year period.
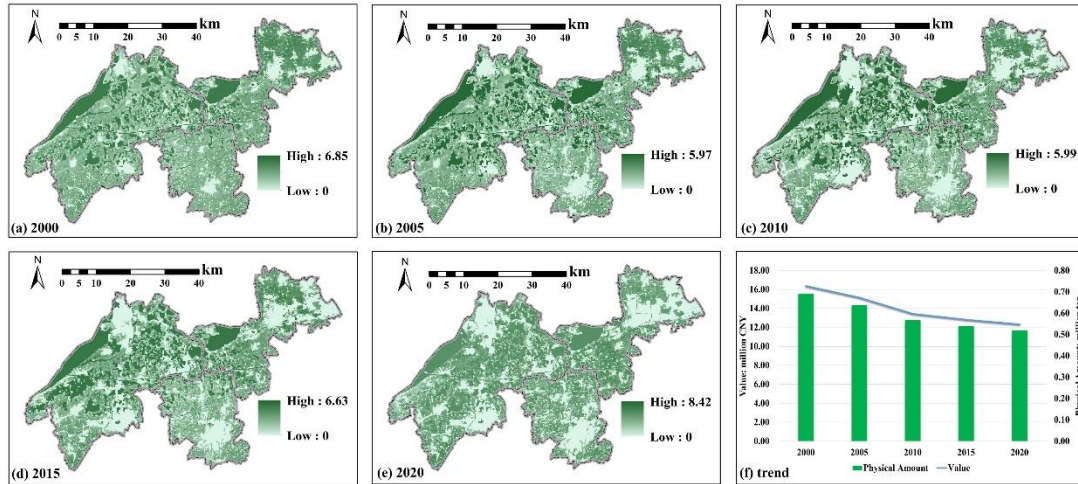
Fig. S3. Spatial Distribution and Trend of Carbon Sequestration from 2000 to 2020. (a), (b), (c), (d) and (e) represent the spatial distribution of Carbon Sequestration in 2000, 2005, 2010, 2015 and 2020, respectively. (f) characterizes trends in Carbon Sequestration over a 20-year period.
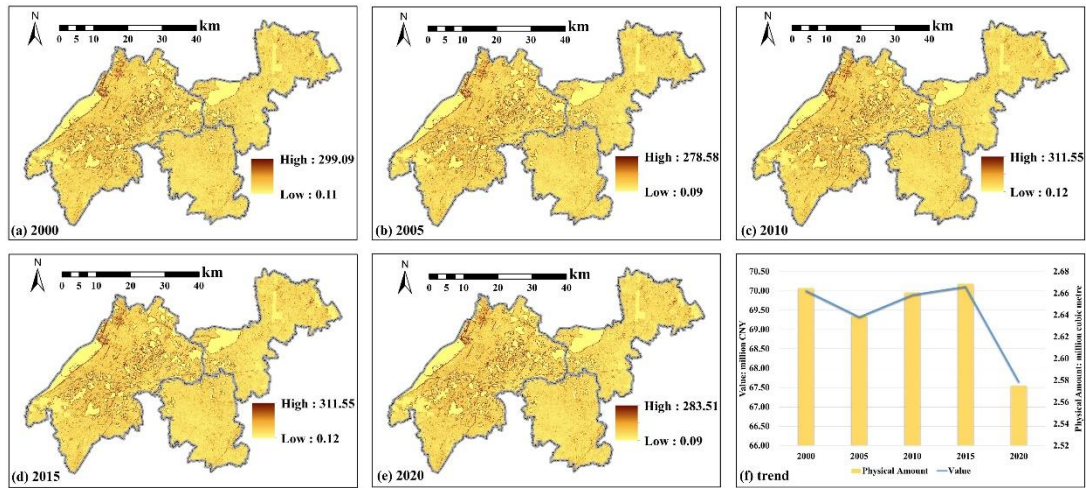

Fig. S4. Spatial Distribution and Trend of Sediment Deposition Reduction Services from 2000 to 2020. (a), (b), (c), (d) and (e) represent the spatial distribution of Sediment Deposition Reduction Services in 2000, 2005, 2010, 2015 and 2020, respectively. (f) characterizes trends in Sediment Deposition Reduction Services over a 20-year period.
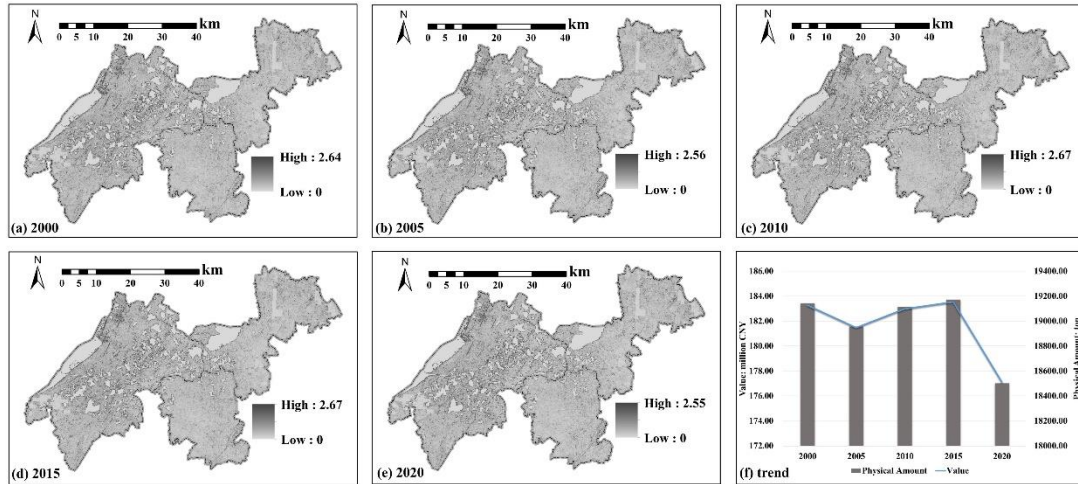
Fig. S5. Spatial Distribution and Trend of Non-Point Source Pollution Reduction (TN) Services from 2000 to 2020. (a), (b), (c), (d) and (e) represent the spatial distribution of Non-Point Source Pollution Reduction (TN) Services in 2000, 2005, 2010, 2015 and 2020, respectively. (f) characterizes trends in Non-Point Source Pollution Reduction (TN) Services over a 20-year period.

Fig. S6. Spatial Distribution and Trend of Non-Point Source Pollution Reduction (TP) Services from 2000 to 2020. (a), (b), (c), (d) and (e) represent the spatial distribution of Non-Point Source Pollution Reduction (TP) Services in 2000, 2005, 2010, 2015 and 2020, respectively. (f) characterizes trends in Non-Point Source Pollution Reduction (TP) Services over a 20-year period.
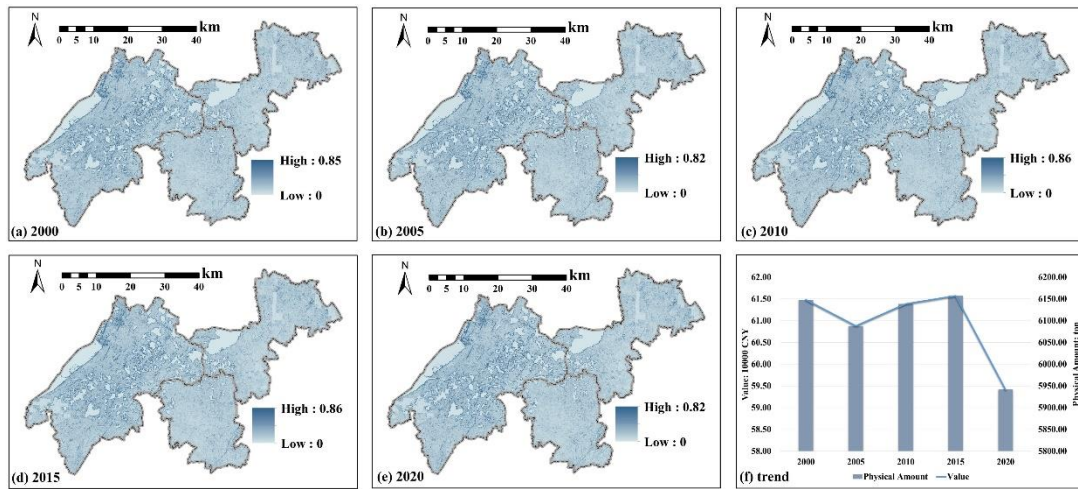
Table S1 Results of Single-Factor Detection q-Values

Factor	Water Conservation		Stormwater Runoff Regulation		Carbon Dioxide Sequestration		Reduction of Sedimentation and Reduction of Non-point Source Pollution	
	q statistic	p value	q statistic	p value	q statistic	p value	q statistic	p value
DEM	0.304	0.043	0.234	0.047	0.269	0.042	0.396	0.005
NDVI	0.286	0.028	0.375	0.033	0.428	0.000	0.621	0.001
NPP	0.105	0.099	0.084	0.093	0.271	0.048	0.093	0.659
Slope	0.208	0.172	0.146	0.327	0.138	0.124	0.782	0.000
Content of sticky particles	0.125	0.325	0.159	0.204	0.081	0.280	0.097	0.119
Content of powder particles	0.171	0.197	0.196	0.042	0.126	0.065	0.065	0.110
Content of organic matter	0.142	0.011	0.162	0.025	0.102	0.039	0.131	0.046
Content of sand particles	0.109	0.265	0.151	0.069	0.115	0.135	0.079	0.197
GDP per square metre	0.200	0.028	0.291	0.025	0.313	0.006	0.019	0.814
Precipitation	0.110	0.035	0.260	0.025	0.126	0.027	0.219	0.021
Distance from water system	0.222	0.028	0.241	0.043	0.148	0.139	0.031	0.979
Distance from railway	0.181	0.194	0.132	0.238	0.094	0.372	0.140	0.352
Distance from major roads	0.065	0.730	0.128	0.644	0.066	0.374	0.086	0.845
Population density	0.283	0.030	0.298	0.008	0.322	0.002	0.117	0.622
Average annual air humidity	0.171	0.111	0.132	0.137	0.152	0.050	0.113	0.312
Average annual temperature	0.169	0.023	0.083	0.086	0.134	0.006	0.061	0.742
Evapotranspiration	0.207	0.064	0.253	0.036	0.212	0.043	0.091	0.127

| Ecosystem types | 0.836 | 0.000 | 0.827 | 0.000 | 0.914 | 0.000 | 0.910 | 0.037 |