Water Ecosystem Service Quality Evaluation and Value Assessment of Taihu Lake in China

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Supplementary Material

Table S1. Description and equations of the variables.

Ecosystem service categories	Services	Equation	Description of the variable	References
Provisioning service	Water supply	$V_w = \sum_{i=1}^{3} W_i \cdot P_i$	V_w: the total value of water supply W_i: the amount of water used for the ith application (tons) P_i: the water supply price for the ith use i = 1, 2, 3: industrial water, agricultural water, and residential water	[4]
	Provide aquatic products	$V_{scp} = A_s \cdot V_{dyy}$ $V_{dyy} = \sum_{n=1}^{4} V_n \Big/ \sum_{n=1}^{4} A_n$	V_{scp}: the value of aquatic products provided by Taihu Lake (100 million yuan) A_s: the water area of Taihu Lake V_{dyy}: the fishery output value per unit area (100 million yuan/km^2) V_n: the total fishery output value (100 million yuan) A_n: administrative division area (km^2) of each city n = 1, 2, 3, 4: Suzhou, Wuxi, Changzhou, and Huzhou, respectively	[1]
	Shipping function	$V_h = Q_{cargo} \cdot P_{cargo} + Q_{passenger} \cdot P_{passengert}$	V_h: shipping value Q_{cargo}: cargo turnover (ton-kilometer) P_{cargo}: cargo turnover price (yuan/ton-kilometer) $Q_{passenger}$: passenger turnover (person-kilometer)	[4]

			$P_{passengert}$: turnover price (yuan/person-kilometer)	
Regulation service	Regulate the atmosphere	$V_g = P_g \cdot Q_g$ $V_y = P_y \cdot Q_y$	V_g: the value of carbon sequestration P_g: the afforestation cost of an absorbed unit of CO_2 (yuan/ton) Q_g: the annual fixed amount of CO_2 (ton) of the water ecosystem V_y: the value of oxygen release P_y: the unit cost of industrial oxygen production (yuan/ton) Q_y: the amount of O_2 released by the water ecosystem (ton) each year	[1][2]
	Water purification	$V_j = \sum_{k=1}^{4} Q_{jk} \cdot P_{jk}$	V_j: the total value of water purification Q_{jk}: the reduction amount of the kth pollutant entering and leaving the lake (tons) P_{jk}: the cost of treating the kth pollutant by the sewage treatment plant (yuan/ton) k = 1, 2, 3, 4: the hypermanganate index, NH_3–N, TP, and TN, respectively	[3]
	Surface water storage	$V_d = Q_d \cdot P_d$	V_d: the storage value of surface water resources Q_d: the capacity of surface water storage (m^3) P_d: the unit storage value	[4]
Support service	Protect biodiversity	$V_s = D_s \cdot F_s \cdot A_s$ $D_s = \frac{1}{3}\sum_{m=1}^{3} S_m \cdot R_m$	V_s: the value of maintaining biodiversity D_s: the ecological service value of 1 standard equivalent factor F_s: the equivalent value of maintaining biodiversity service function in per unit area of water ecosystem S_m: the percentage (%) of the cultivated area of the mth crop in the total cultivated area of the crops	[5]

			R_m: the average net profit per unit area of the mth crop in the country (yuan/mu) m = 1, 2, 3: rice, wheat, and rapeseed, respectively	
	Soil conservation	$V_r = \frac{1}{3}\sum_{m=1}^{3} S_m \cdot R_m \cdot F_r \cdot A_s$	V_r: the soil conservation value (yuan/year) F_r: the soil conservation service value equivalent per unit area of the water ecosystem	[5]
Cultural service	Tourism and leisure	—— ——	It is calculated by the price substitution method. The difference between operating income and expenditure (i.e., operating profit) was used to quantify the value of tourism and leisure in Taihu Lake	[6]
	Research and education	$V_{ky} = P_{ky} \cdot A_s$	V_{ky}: the value generated by scientific research and education P_{ky}: the average value generated by scientific research and education per unit area of wetland	[7]

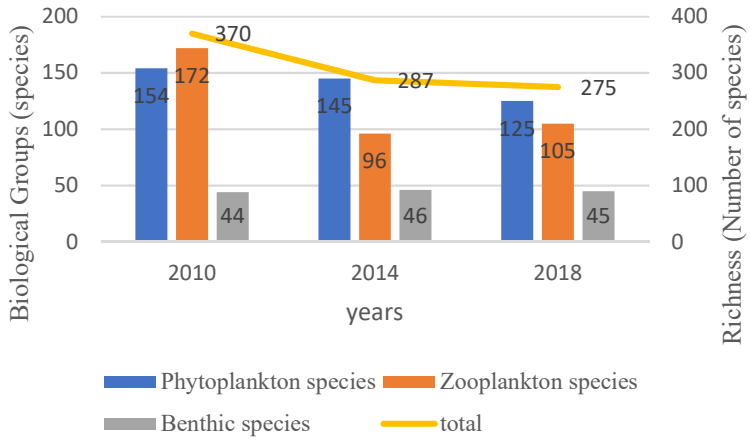

Figure S1. Biological species of Taihu Lake.

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