Supplementary Materials

Table S1. Detailed accounting methods of Provisioning ecosystem service.

Categories	Material quantity method	Monetary value method
Agricultural products, Forestry products, Animal husbandry products, Fishery products, Water resources.	$M_P = \sum_{i=1}^{n} O_i$ where n represents ecosystem service categories, M_P represents total output of ecosystem products, and O_i represents the output of ecosystem products i in the QMs.	$V_P = \sum_{i=1}^{n} (O_i \times P_i \times \alpha_i - C_i)$ where n represents ecosystem service categories, V_P represents total monetary value of ecosystem products (CNY), and P_i represents the price of ecosystem products i (CNY), α_i denotes the premium coefficient of the commodity, namely the ratio between its actual price and the published price. Typically, this coefficient is set to 1. C_i represents the labor cost and the capital invested in supplying the product (CNY) in the QMs.

Notes: In the QMs, the output and prices of ecosystem products of different years at district-county scale were obtained from statistical yearbooks and some data counted by local authorities.

Table S2. Detailed accounting methods of Regulating ecosystem service.

Categories	Material quantity methods	Monetary value methods
Water conservation service	$M_{WC} = \sum_{j=1}^{n} S_j \times (P_j - R_j - ET_j)$ where n represents number of land use types, M_{WC} represents total amount of water conservation (km^3/a), S_j represents the area of type j land use (m^2), P_j represents precipitation(mm/a), R_j represents the runoff (mm/a), and ET_j represents evapotranspiration (mm/a) in the QMs.	$V_{WC} = M_{WC} \times P_W$ where V_{WC} represents total monetary value of water conservation (CNY), and P_W represents the price of water resource (CNY /km^3) in the QMs.
Water purification service	$M_{WP} = \sum_{i=1}^{n} S \times P_i$ where n represents number of pollutants types (COD, total nitrogen and total phosphorus), S represents wetland area (km^2), M_{WP} represents total amount of water purification (t/a) and P_i represents purification capacity of type i pollutant (t/(km^2·a)) in the QMs.	$V_{WP} = M_{WP} \times C_i$ where V_{WP} represents total monetary value of water purification (CNY), and C_i represents the cost of control water pollution in the QMs (CNY/t).
Flood regulating service	The ecosystem can mitigate and regulate the extreme rainstorms and floods through lake water storage and reservoir flood control measures. In this study, common models were used to evaluate the flood regulating capacity of lake and reservoir, respectively. **For flood regulating of reservoirs** $M_{fm} = S_{fm} + C_{fm}$	$V_{fm} = M_{fm} \times P_{re}$ where V_{fm} represents total monetary value of flood storage capacity (CNY), P_{re} represents the construction cost of reservoirs (CNY/m^3) in the QMs.

	where M_{fm} represents flood storage capacity of a reservoir (m^3/a), S_{fm} represents available flood storage capacity of the reservoir (m^3/a) and C_{fm} represents flood control capacity of the reservoir (m^3/a) in the QMs. **For flood regulating of lakes** There is a quantitative relationship between the storage capacity and the area of lake. Therefore, in mountainous areas, the following models can be constructed to evaluate the storage capacity of lake. $$\ln(S_{fm}) = 0.6566 \times \ln(A_l) + 5.4094$$ where S_{fm} represents available flood storage capacity of a lake (m^3/a) and A_l represents the lake area (m^2).	
Carbon sequestration service, Oxygen release service	The green plants in the ecosystem fix carbon dioxide, produce organic matter, and release oxygen into nature through photosynthesis, thus providing carbon fixation and oxygen release function. Specifically, every 1kg of organic matter produced by vegetation can fix 1.63kg CO_2 and release 1.2kg O_2, so the carbon fixation and oxygen release of the ecosystem in the QMs can be calculated from the NPP data (Net Primary Productivity) of vegetation. **For Carbon sequestration service** $$M_{CO_2} = NPP \times 2.2 \times 1.63$$	In this study, the international carbon tax law of Sweden was used to estimate the value of carbon sequestration, and the local carbon tax rate of CNY was converted from the exchange rate of CNY to US dollar in each year. **For Carbon sequestration service** $$V_C = M_C \times E_y \times 10^{-6}$$ where V_C represents total monetary value of carbon sequestration (CNY/m^2) for a certain year, E_y represents the local carbon tax rate of CNY for a certain year y (CNY/t) in the QMs. **For Oxygen release service**

	where M_{CO_2} represents amount of carbon dioxide fixed per unit area(g/m²), *NPP* represents the net primary productivity of vegetation per unit area (g C/m²) in the QMs. Typically, 1kg CO_2 contains 0.27kg of carbon. Therefore, the carbon sequestration amount of the ecosystem in the QMs can be further obtained. $$M_C = M_{CO_2} \times 0.27$$ where M_C represents amount of carbon sequestration per unit area (g/m²). **For Oxygen release service** $$M_O = NPP \times 2.2 \times 1.2$$ where M_O represents amount of oxygen release per unit area (g/m²) in the QMs.	In this study, the commonly used shadow price method of industrial oxygen production is used to estimate the oxygen release value of ecosystem. $$V_O = M_O \times 400 \times 10^{-6}$$ where V_O represents total monetary value of the oxygen release (CNY/m²) in the QMs and 400 refers to the cost of industrial oxygen production (CNY/t).
Air purification service	Air purification service refers the ability of the air in the ecosystem to purify pollutants, and the main pollutant indicators include sulfur dioxide and nitrogen oxides. The specific calculation formula is as follows: $$M_{AP} = \sum_{i=1}^{n}\sum_{j=1}^{m} M_{ij} \times S_j$$ where n represents the number of types of ecosystem service, m represents the number of types of atmospheric pollutants, S_j represents the area of type j ecosystem (km²), M_{ij} represents the annual purification capacity of type i ecosystems for type j pollutants	The specific calculation formula is as follows: $$V_{AP} = \sum_{i=1}^{n}\sum_{j=1}^{m} M_{ij} \times C_j$$ where n represents the number of types of ecosystem service, m represents the number of types of atmospheric pollutants and C_j represents the treatment cost of j-type air pollutants (CNY/t) in the QMs.

	(t/(km²·a)) and M_{AP} represents the total amount of air purification (t/a) in the QMs.	
Climate regulating service	The regulation of the ecosystem on climate is mainly primarily demonstrated through the processes of cooling and humidification, so the energy changes of vegetation transpiration and water surface evaporation can be used to evaluate the climate regulating service. $$M_{ET} = M_{PT} + M_{WE}$$ where M_{ET} represents the total energy consumed by evapotranspiration (kw·h/a), M_{PT} represents the total energy consumed by vegetation transpiration (kw·h/a) and M_{WE} represents the total energy consumed by water surface evaporation (kw·h/a) in the QMs. $$M_{PT} = \sum_{j=1}^{3} \frac{E_j \times S_j \times D \times 10^{-6}}{3600 \times R}$$ where E_j represents the total energy consumed by transpiration (kw·h/d) of type i vegetation (woodland, grass or shrubs), S_j represents the area of this vegetation (km²), D represents the running days of air conditioner in a year (d) and R represents the energy efficiency ratio of air conditioner in the QMs, which is usually set to 3. $$M_{WE} = \frac{E_W \times h \times 10^3}{3600}$$ where E_W represents the amount of water surface evaporation (m³/a), h represents the latent heat for evaporating 1g of water (J/g).	On the basis of energy calculation and the replacement cost method, the climate regulation energy of cooling and humidification can be converted into the electricity consumed by artificial temperature regulation, and the overall monetary value of climate regulation service can be obtained by electricity price. $$V_{ET} = M_{ET} \times P_E$$ where V_{ET} represents total monetary value of climate regulating service (CNY), P_E represents the electricity prices (CNY/ kWh) in the QMs.

Soil conservation service	The soil conservation service is usually evaluated by the difference between the potential soil erosion amount of an ecosystem without vegetation cover and the actual soil erosion amount of the ecosystem with the actual vegetation cover. $$M_{SC} = A_P - A_R = R \times K \times L \times S \times (1 - C \times P)$$ where M_{SC} represents the amount of soil conservation service (t·ha^{-1}·a^{-1}), A_P represents the potential soil erosion amount (t·ha^{-1}·a^{-1}), A_R represents the actual soil erosion amount (t·ha^{-1}·a^{-1}), R represents rainfall erosivity factor (MJ·mm·ha^{-1}·h^{-1}·a^{-1}), K represents soil erodibility factor (t·ha·h·ha^{-1}·MJ^{-1}·mm^{-1}), L represents the slope length factor, C represents the vegetation cover factor in the QMs.	Through the replacement cost method, the cost of reservoir desilting project is calculated, and the monetary value of water conservation service in regional ecosystem is calculated indirectly. $$V_{SC} = \frac{M_{SC} \times \alpha \times C}{\rho}$$ where V_{SC} represents the monetary value of soil conservation service (CNY/t), α represents coefficient of sediment deposition, C represents the cost of reservoir dredging per unit (CNY/m^3) and ρ represents the soil bulk density in the QMs.

Notes: In the QMs, the output and prices of ecosystem products of different years at district-county scale were obtained from statistical yearbooks and some local statistical data.

Table S3. Detailed accounting methods of Cultural ecosystem service.

Categories	Monetary value method
Ecological tourism service	$V_T = \sum_{k=1}^{n} I_K \times R$ where n represents the number of districts and counties, V_T represents total monetary value of ecological tourism service (CNY), I_K represents tourist income in a certain district or county K (CNY), and R represents the proportion of ecotourism income to total tourist income in the QMs (CNY).

Notes: In general, the tourism income of a region is composed of various types. This study only involves the ecotourism income that relies on natural tourism resources due to the support of the ecosystem in the QMs.