sustainability

Article

For the Better Protection of Wetland Resources: Net Value of Ecosystem Services after Protective Development of Xixi Wetland in Hangzhou, China

Shanfeng Zhang [1,*], Zhengjun Cheng [1], Wenfeng Liang [2] and Liang Ding [1]

[1] School of Design and Architecture, Zhejiang University of Technology, Hangzhou 310014, China
[2] Zhejiang Urban and Rural Planning Design Institute Co., Ltd., Hangzhou 310030, China
* Correspondence: zhangsf@zjut.edu.cn; Tel.: +86–138-580-82-361

Abstract: Wetlands are valuable urban resources and can provide various ecosystem services for cities. In order to face the continuous urbanization and market economy environment, relevant government-related management, decision-makers, and stakeholders can make objective and comprehensive value judgments and decide the fate of urban wetland resources. Our quantitative approach to the ecosystem services value provided by wetlands produced clear, direct, and persuasive monetization data. The assessment of the net value of ecosystem services (NES) provides one such method. Considering the transition of the Xixi Wetland into the Xixi National Wetland Park in Hangzhou as an example, we first determined the calculation model of its NES. Second, we utilized the equivalent factor, contingent valuation, travel cost, and benefit transfer methods to calculate its value of ecosystem services (VES), service cost, and NES. The results are shown below. In 2016, the VES of Xixi Wetland park was RMB 16.973 billion, NES was RMB 16.938 billion, and service cost was RMB 34.8158 million. The value of cultural services was the main contributor to NES, which accounted for 99.27% of the total. Real estate appreciation, cultural heritage, and recreational value were the main contributors to its cultural service value. Third, through the scenario comparison, we concluded that the NES of the protective development model (the wetland park mode) adopted by Xixi Wetland was RMB 3.186 billion more than that of the protection model. In other words, the protective development model is more practical and sustainable for protecting the Xixi Wetland. Finally, the limitations and shortcomings of the study are summarized.

Keywords: ecosystem service; value assessment; benefit–cost analysis; scenario analysis; protective development; Xixi Wetland park

check for updates

Citation: Zhang, S.; Cheng, Z.; Liang, W.; Ding, L. For the Better Protection of Wetland Resources: Net Value of Ecosystem Services after Protective Development of Xixi Wetland in Hangzhou, China. *Sustainability* **2023**, *15*, 5913. https://doi.org/10.3390/su15075913

Academic Editor: Franco Salerno

Received: 22 February 2023
Revised: 22 March 2023
Accepted: 26 March 2023
Published: 29 March 2023

1. Introduction

The rise and decline of human civilization are closely related to ecosystems, which provide a variety of direct and indirect services to humans [1,2]. However, due to human activities and climate change, ecosystems are facing many threats, such as pollution, overexploitation of resources, poor water quality, etc., so ecosystems increasingly have become one of the hot topics in ecology and economics [3].

Ecosystem services (ESs) are "a variety of benefits that humans derive from the ecosystem" [4] or "the direct or indirect contribution from ecosystem to human well-being and benefits" [5,6]. In scientific research, ESs can be traced back to the understanding of the value of wild animals and plants in the mid-1960s [7]. At the beginning of the 21st century, the study of ES was further deepened. Some scholars have divided ES into regulation, supply, support, cultural services, etc. The study of ESs, especially the evaluation of VES has long been a research hotspot; it has become an intersection of various fields, connecting ecology, economics, sociology, landscape architecture, etc. [8].

The value of ecosystem services is a method of quantifying and distributing the economic value of ecosystem goods and services and their functions [9]. VES provides an important basis for ecological function zoning, ecological compensation decision-making, ecological environment protection, and environmental economic accounting [10]. Chinese scholars have conducted a great deal of research on different types of ecosystem service value assessment and made numerous achievements [11–13]. However, in reality, many costs are involved in the normal operation of an ecosystem, so the evaluation of VES cannot ignore those costs [14]. At present, only a few scholars have begun to study calculating the net value of ecosystem services (NES) [15–17]; the NES is defined as the value of ecosystem services (VES) that subtracts all the costs from the services the ecosystem provides to humans [18].

Wetlands are a key component of ecosystems, but many wetlands have disappeared with rapid urbanization. From 1960 to 1974, due to urban construction and construction waste, eight lakes, including Taiping Lake and Goldfish Pond, were successively landfilled in Beijing, resulting in a total loss of 33.4 hectares of lake water surface. As a special ecosystem in cities, urban wetlands provide important ecosystem services for urban sustainable development and have important social, ecological, and economic value in scientific research, flood regulation, leisure tourism, ecological balance, and material production [19]. Cities should not eliminate, but protect, wetlands.

At present, many international organizations, experts, and scholars have studied wetland ESs from the perspective of concept definition. On the landscape scale, many VES studies have been conducted from the perspectives of recreation services [20] and aesthetic value [21]. However, NES studies on urban wetlands space at the site scale are scarce, and most of them are based on considering the impact of a single value. Regarding mainly research on the urban wetlands space and its surrounding residential added value [22], relevant quantitative measurement methods for determining the compound economic value of wetlands space are lacking. However, the quantitative measurement of the complex economic value of wetlands is important. Whether studying the feasibility of ecological projects before implementation or the evaluation of post-implementation performance, the determination of the service value of natural of artificial ecosystems often ignores the cost, or the cost is incompletely calculated, distorted, or exaggerated, which, in turn, affects the decision-making in land planning, use, and management [23]. As such, more scientifically and quantitatively evaluating the net value of urban wetland services has become a key issue.

Hangzhou Xixi Wetland is the first national wetland park approved by the State Forestry Administration of China, and its real systematic and integrated protection began with the Xixi Wetland Comprehensive Protection Project in 2003. With the completion of the comprehensive protection project of Phases I, II, and III, Xixi Wetland National Park, on the one hand, strictly protects the ecosystem, but on the other hand, it also builds necessary tourist service facilities. Since its opening in 2005, the park has attracted 45 million visitors in total. The "Xixi model" of wetland protection and utilization is of great significance; Peter Bridgewater, former Secretary General of the International Convention on Wetlands Organization, said after his investigation of Xixi Wetland that "the comprehensive protection of Xixi wetland has provided a good experience for the construction of other wetlands around the world" [24]. However, there are few studies on the NES in Xixi Wetland National Park.

In the study, we used Hangzhou Xixi Wetland as an example to evaluate the implementation of protective development and explored the differences produced by different conservation and development strategies for wetlands. As such, we (1) calculated the VES of the Xixi Wetland after the completion of protective development; (2) calculated the service cost of the Xixi Wetland after the same completion; and (3) compared the differences between protection development and single protection mode through scenario analysis. This study provides certain reference value for the governance and use of the services of urban wetland resources.

2. Materials and Methods

2.1. Overview of Study Area

The Xixi Wetland is located in the west of the main urban area of Hangzhou (Figure 1). It is a secondary wetland in a city where the ecosystem was severely damaged and the ES function was seriously degraded [25]. In 2003, before the implementation of the "West Lake Wetland Comprehensive Protection Project (Phase I)" in Hangzhou, the wetland area had decreased from a maximum of nearly 60 km^2 to only 10.08 km^2. The wetlands host intensive and chaotic villages and houses. Endogenous domestic and agricultural pollution has been caused by crowded population, agriculture, and fishery production, and exogenous industrial and domestic pollution have continually reduced the ES effectiveness of the Xixi Wetland to the point where some ESs are no longer provided. In 2005, the Xixi Wetland Park (Phase I) was completed and opened. In the same year, the State Forestry Administration approved it as the first national wetland park in China (Xixi National Wetland Park). Subsequently, with the implementation of the second and third phases of the Xixi Wetland Comprehensive Protection Project in November 2009, the park was added to the list of internationally important wetlands. In January 2012, Xixi National Wetland Park was rated a 5A tourist attraction by the National Tourism Administration.

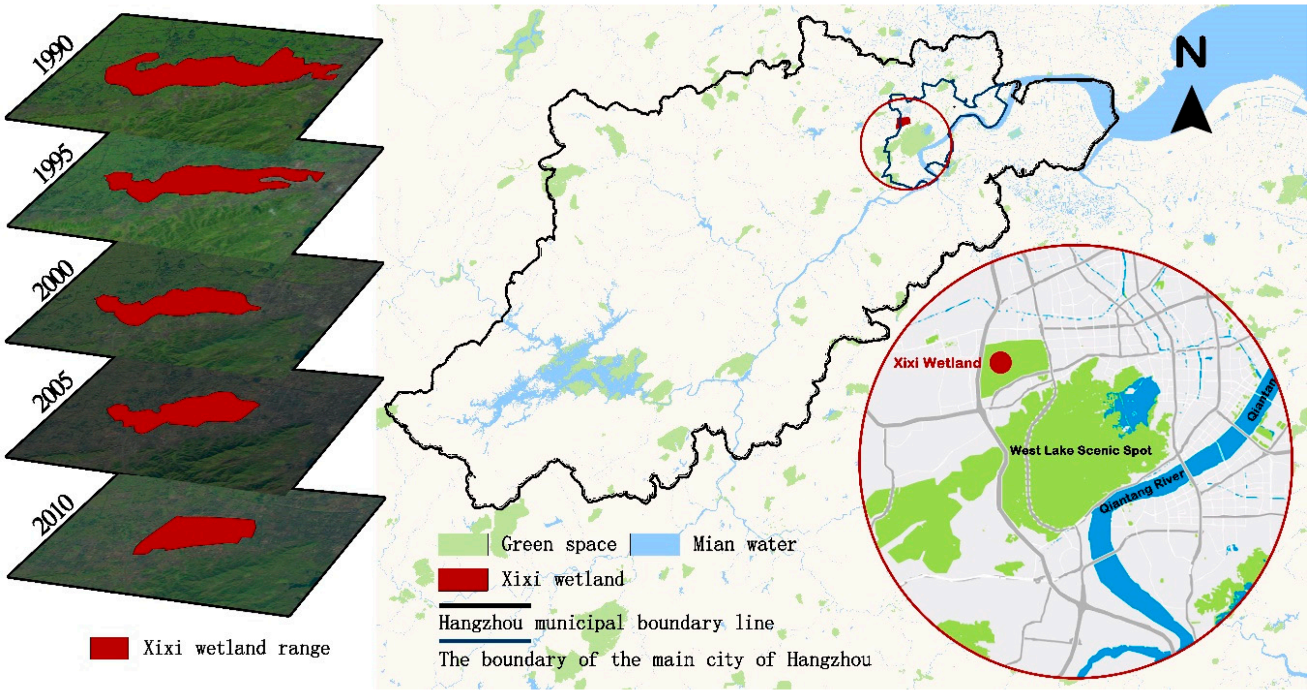

Figure 1. Geographic location of Xixi Wetland in Hangzhou.

2.2. Computation Model

The supply of ESs necessarily corresponds to the input of cost. Cost–benefit analysis (CBA) refers to the idea that an economic entity estimates and measures the inputs and outputs for economic activities under the market economy conditions to obtain the maximal benefit at the minimal cost. CBA can be used to determine whether a project is a sound investment and to assess the real performance (net cost or net benefit) of the implemented project. According to the principle of CBA and referring to the literature [15,16,26], the formula of NES of Hangzhou Xixi National Wetland Park was established:

$$\mathrm{NES} = \mathrm{VES} - \mathrm{C}, \tag{1}$$

$$\mathrm{VES} = \sum_{i=1}^{n} V_i, \tag{2}$$

$$C = \sum_{j=1}^{m} C_j, \quad (3)$$

where VES is the total value of ESs in Xixi National Wetland Park, V_i is the value of its ith ecosystem service, i is the number of categories of its ESs, C is the total cost of providing ecosystem services to the ecosystem of Xixi National Wetland Park, C_j is its jth cost, and j is the cost of an item required to provide ESs.

2.3. Study Materials

2.3.1. Index for Measuring Value of Ecosystem Services

The diversity of ecosystem functions determines the diversity of ESs; the results of ES classification are also diverse. On the basis of the representative results of ES classification, combined with the regional characteristics in the urban area of Hangzhou Xixi National Wetland Park and the availability of research data, we established the VES measurement index for Xixi National Wetland Park (Table 1).

Table 1. VES measurement index for Xixi National Wetland Park.

Service Category	Description of Service Category	Service Measuring Index
Regulatory service	Benefits derived from regulatory functions of ecosystem processes	Air regulation Climate regulation Hydrological regulation Waste treatment
Supply service	Product derived from the ecosystem	Food production Raw material production
Support service	Indispensable service to produce all other ESs	Maintaining the soil Maintaining biodiversity
Cultural service	Nonmaterial benefits from the ecosystem	Recreation Scientific research and education Cultural heritage Appreciation of real estate

Note: Collated from the reference [3,27–29].

2.3.2. Index for Measuring Cost of Ecosystem Services

The cost for the restoration and maintenance of ecosystems is huge. Determining the cost index as much as possible for the implementation of the protective development of the Xixi Wetland is a basis for its NES assessment. In this study, the cost of providing services to the Xixi National Wetland Park ecosystem was divided into three categories: direct, opportunity, and other costs. Direct cost was further divided into wetland restoration and park construction costs, as well as wetland maintaining and park operating costs after the restoration of wetland and the completion of park. Opportunity cost, that is, the "crowding effect" of the Xixi Wetland resources, is positioned in the park-style use of the wetland, which has resulted in loss of income from the original, potential, or possible alternative projects. Other costs can include the direct or potential expenditure from negative effects, such as plant pests, fire disaster, soil erosion, environmental pollution, and emission of greenhouse gases that may occur in the Xixi National Wetland Park.

2.4. Computation Method

2.4.1. Ecosystem Regulatory, Supply, and Support Services

The value of ecosystem adjustment service, supply service and support service can be obtained by the equivalent factor method. The equivalent factor method is based on quantifiable criteria for constructing the value equivalence of the multiple service functions of an ecosystem based on differentiating the functions of ESs and then performing an evaluation combined with the distribution area of the ecosystem [3,28]. The economic value of a standard unit ES value equivalent factor (standard equivalent) is 1/7 of the national average grain yield value of the year [30,31]. On the basis of that, the formula for calculating the standard equivalent value of ESs in the Xixi National Wetland Park is as follows:

$$\mathrm{V}_{crop} = \frac{1}{7} \times (\mathrm{P} \times \mathrm{E}), \tag{4}$$

Whewhere V_{crop} is the value of one standard equivalent of the Xixi National Wetland Park's ESs (RMB/hm^{-2}); P is the average grain yield of Hangzhou in the study period (RMB/hm^{-2}), and E is the unit price of grain (RMB/kg^{-1}) in Hangzhou during the study period. We further established the formula for calculating the value of a service in the Xixi National Wetland Park Ecosystem as follows:

$$\mathrm{EV}_i = \mathrm{A} \times \mathrm{V}_i, \tag{5}$$

$$\mathrm{V}_i = \mathrm{W}_i \times \mathrm{V}_{\mathrm{crop}}, \tag{6}$$

where A is the area of the Xixi National Wetland Park; EV_i is the ith service value of its ecosystem; V_i is the ith service value of its ecosystem's unit area; and W_i is the ith service of its ecosystem's unit area value equivalent.

2.4.2. Ecosystem Cultural Service

The value of ecosystem cultural service can be calculated by the contingent valuation method (CVM), travel cost method (TCM), and the benefit transfer method (method of results reference). Among them, CVM evaluates the value of public goods by asking people what they are willing to pay (WTP) or willing to accept (WTA) for intangible benefits [32]; this can be used to calculate the value of real estate appreciation and cultural heritage. TCM is a nonmarket value assessment method for tourism resources that is based on consumer choice theory. The zonal TCM (ZTCM) is used to calculate the value of a destination on the basis of data such as the tourist's traveling area, the traveling rate of the traveling area, the average traveling cost from the beginning to the destination, and traveling time [33,34]; this study uses it to calculate recreation value. The benefit transfer method refers to the method of transferring the existing resource value evaluation results (often refers to study sites) to the area to be studied (commonly refers to as political location) and obtaining the value of the policy resources. The specific calculation methods are divided mainly into numerical and function transfer. In numerical transfer, one or several empirical studies that are similar to the policy resource attributes are collected, and the evaluation results (or the average of the evaluation results) are directly used as the value of the political location [35]. We used the numerical transfer method to measure the value of scientific research and education of Hangzhou National Wetland Park. Urban green park space is a public or quasi-public item [14].

(1) Appreciation of real estate

Real estate appreciation was calculated as follows:

$$\mathrm{HV} = \sum_{i=1}^{n} HP_i \times A_i, \tag{7}$$

where, within the scope of property appreciation, HV is the total appreciation of Xixi National Wetland Park in its affected area; HP_i is the per-square-meter appreciation of the ith type of residential area (RMB/m^2); A_i is the total floor area of the ith type of residential area (m^2); and i is the type of residential area.

Green spaces have a positive impact on the properties around them, and people are willing to pay higher prices to buy properties near a park [14,32–39]. Additionally, the effect of appreciation of green spaces on real estate decreases with the increase in distance from them, until it disappears. The effect of the appreciation of green spaces on real estate exists mainly within the range of 100–500 m from a green space, where the larger the green area, the stronger the appreciation in real estate value [38]. Xixi National Wetland Park is a large-scale municipal park green space, so we set the distance of its impact on the value of surrounding real estate to 500 m. On the basis of the integrated remote sensing images and on-site investigation, we identified 29 residential areas within 500 m of the park. In the study, these 29 residential areas were divided into low-level (low-density), multilevel, and high-rise residential areas; we then calculated the A_i for each. For a survey regarding the WTP of owners for property appreciation for the construction of Xixi National Wetland Park (that is, the price paid per square meter of residential willingness), 300 questionnaires were distributed, and 277 questionnaires were recovered, 246 of which were valid. The respondents included 65 low-rise, 92 multistory, and 89 high-rise residential owners. As the statistical results of the questionnaire showed that the WTP value of the interviewed owners differed and the concentration was not high, we used the common treatment methods used in related studies at home and abroad for reference. We used the median value of the WTP of the interviewed owners in the different categories as the corresponding HP_i value for the property value calculation.

(2) Cultural heritage

Drawing on the nonuse value theory of environmental resources in environmental resource economics [39], the cultural heritage value of Xixi National Wetland Park was divided into three categories: (1) select value (SV), having the opportunity to choose to use the resources of Xixi Wetland Park for oneself or others; (2) bequest value (BV), the natural and cultural resources contained in the Xixi Wetland can be reserved for future generation; and (3) continuous value (CV), the natural scenery and valuable cultural heritage of Xixi Wetland Park can last forever.

The formula for calculating cultural heritage is as follows:

$$\mathrm{NV} = \mathrm{CP_m} \times Popu \times \mathrm{Prop}, \tag{8}$$

where NV is the cultural heritage value of Xixi National Wetland Park; CP_m is the WTP of tourists for protecting the value of cultural heritage; $Popu$ is the number of tourists in Hangzhou in the study year; and $Prop$ is the rate that the sample tourists are willing to pay (the proportion of tourists' WTP to protect the value of the documentary heritage of Xixi National Wetland Park).

When surveying the tourists willing to protect the cultural heritage of Xixi National Wetland Park, 500 questionnaires were distributed, and 487 questionnaires were recovered, 458 of which were valid. Here, the median value of the WTP of a visitor who is willing to bear the cost of protecting this cultural heritage was also used as the $\mathrm{CP_m}$ for the calculation. According to the statistics of the questionnaire, $\mathrm{CP_m}$ was 50 RMB/year·person, and 53.5% of respondents had a willingness to pay this cost. According to Hangzhou's 2016 Tourism Statistics, the number of tourists in Hangzhou in 2016 was 140,590,800.

(3) Recreation

We used the ZTCM to calculate the recreational value of Xixi National Wetland Park as

$$\mathrm{RV} = \mathrm{TC} + TV + TS, \tag{9}$$

where RV is the recreational value of Xixi National Wetland Park, TC is the traveling cost, TV is the traveling time value, and TS is the surplus value of consumers (visitors).

I. Traveling cost

$$\mathrm{TC} = \mathrm{JC} + \mathrm{OC}, \tag{10}$$

where JC is the journey cost, and OC is the other costs.

① Journey Cost

$$\mathrm{JC} = \sum_{i=1}^{n} T_i \times TR_i \times Z, \tag{11}$$

$$TR_i = \frac{V_i}{P_i}, \tag{12}$$

$$V_i = Z \times \frac{n_i}{N}, \tag{13}$$

where T_i is the round-trip transportation cost for the tourists in traveling area i to Xixi National Wetland Park; TR_i is the ratio of the tourists from a traveling area who choose the wetland as the destination (the traveling rate); Z is the total number of tourists in the study year; V_i is the annual number of visitors to traveling area; P_i is the population of traveling area i in the study year; n_{i} is the number of visitors in traveling area i in the valid questionnaires; P is the number of valid questionnaires (500 questionnaires were distributed in the survey, and 458 valid questionnaires were obtained); and i is the number of traveling area.

Determine i. In general, a traveling area is divided according to the provincial administrative area; usually, 20–30 is reasonable [40]. According to the statistical results of the questionnaire, the provincial administrative area was divided into 29 traveling areas; in addition, due to the large number of local tourists, Hangzhou was separately considered as a single traveling partition. As such, we considered a total of 30 traveling partitions.

Determine Z. According to the 2016 Hangzhou Tourism Overview issued by the Hangzhou Tourism Management Committee, the number of tourists in Xixi National Wetland Park was 4.9719 million.

Determine T_i. According to the statistical result of the questionnaires, local tourists traveled mainly by bus (accounting for 54.5%), and foreign tourists relied mainly on trains (37.4%) and airplanes (28.3%). We set the provincial capital of the provincial administrative region as the starting point of the trip and the end point as Hangzhou; the seat level was hard sleeper, motor train, second seat in high-speed rail, and aircraft economy class. We determined the train fare from the official 12,306 website and the average airfare from the Go-Where website. The local tourist fare was calculated as taking an air-conditioned bus with no transferring. In this process, the travel time of the corresponding traveling zones was also computed.

Determine P_i. We adopted data from the corresponding provincial and municipal 2016 National Economic and Social Development Bulletin.

② Other Costs

The other costs in this study included travel expenses for park tickets, in-park dining, special merchandise purchases in the park, and recreational activities. We built the formula of other costs as follows:

$$\mathrm{OC} = \mathrm{VS} \times \mathrm{Z}, \tag{14}$$

where VS is the average daily expenses of tourists in Xixi National Wetland Park, and Z is the annual received volume of tourists. In addition, we considered the four theme festivals, the Plum Blossom Festival, Flower Festival, Fire Persimmon Festival, and Reed Festival (festival days account for one-third of the total opening days in the year), in the Xixi National Wetland Park. Therefore, the questionnaire was designed using questions about "other costs of nonfestival and festival travel" to obtain the data. According to the statistical results, the average daily cost of tourists on non-themed festival days was 261.0 RMB/person·time (accounting for 54.4%). The average daily cost on a festival day was 361.0 RMB/person·time (accounting for 45.6%).

II. Traveling time value

Traveling time includes traveling and on-site time, which was calculated as follows:

$$\mathrm{TV} = \sum_{i=1}^{n} (JT_i + VT_i) \times OPT_i \times TT_i, \tag{15}$$

where JT_i is the round-trip journey time of the tourists from traveling area i to the Xixi National Wetland Park; in previous statistics, the traveling time of the corresponding traveling area was counted, and the local tourists take 1 h. VT_i is the traveling time of each visitor in traveling area i, and the value in the questionnaire was 3 h (accounting for 71.2%). OPT_i is the unit time opportunity salary of the traveling area i; the opportunity wage per unit time is usually taken as 1/3 of the unit income [41]. Using the annual working time of 248 days, 1984 h, using the disposable income of urban residents in the 2016 National Economic and Social Development Bulletin, we calculated the OPT_i value of each traveling area. TT_i is the number of visitors to the Xixi National Wetland Park.

③ Surplus value of consumer

According to relevant study results, TS is approximately 40% of TC [42]; that is,

$$\mathrm{TS} = \mathrm{TC} \times 40\%, \tag{16}$$

(4) Scientific research and education

The formula is as follows:

$$\mathrm{SV} = \mathrm{A} \times P_s, \tag{17}$$

where SV is the scientific and educational value of Xixi National Wetland Park; A is its area; P_s is the scientific and educational value of its unit area ecosystem. Referring to the literature, the average value of scientific research and education of the inland wetland ecosystem is 463,000 RMB/km^2, the maximum value is 1.478 million RMB/km^2, and the minimum value is 210,000 RMB/km^2 [43]; the results are based on 2008. This study uses the GDP parameter method to adjust the data to 2016 (Hangzhou's 2008 and 2016 GDPs were RMB 478.10 billion and RMB 1170 billion) [44]; the adjusted average was 1.133 million RMB/km^2, and it is used as the Ps for the calculation.

2.4.3. Ecosystem Service Cost

We will continue to use the numerical transfer method in the benefit transfer method to measure the ES cost of Hangzhou National Wetland Park.

The formula for calculating service cost is as follows:

$$C_j = \mathrm{A} \times C_s, \tag{18}$$

where C_j is the jth cost of providing services to the Xixi National Wetland Park ecosystem; A is its area; and C_s is the cost of providing services to its unit area of ecosystem. According to the literature, the direct, opportunity, and other costs of China's wetland ecosystem services in 2014 were 99,000, 1.59 million, and 534,000 RMB/km^2, respectively [19]. Using the GDP parameter method (Hangzhou's GDP in 2014 and 2016 was RMB 920.10 billion and 1170 billion, respectively). The above data were uniformly adjusted to the corresponding Cs values in 2016, which were 159,900, 2.0295 million, and 679,900 RMB/km^2, respectively. Finally, the direct cost of providing services for the Xixi National Wetland Park Ecosystem in 2016 was RMB 1,269,100, the opportunity cost was RMB 20,854,400, the other costs were RMB 6,844,300, and the total cost was RMB 28,570,800. In addition, since the Xixi Wetland has become a commercial wetland park after restoration, it was necessary to calculate the labor cost and public and office costs of its normal management and operation into direct costs. According to the 2016 annual expenditure final announcement of the Hangzhou Xixi Wetland Park Management Committee Office, these costs amounted to RMB 6.245 million.

In summary, the equivalent factor method, contingent valuation method (CVM), travel cost method (TCM), and benefit transfer method were respectively adopted in this study to calculate the value and cost of ecosystem services (detailed data are shown in Table 2).

Table 2. Calculation method of VES and service cost index system in Xixi Wetland.

Measuring Category	Measuring Index	Calculation Method
Regulatory service	Air regulation Climate regulation Hydrological regulation Waste treatment	Equivalent factor method Equivalent factor method Equivalent factor method Equivalent factor method
Supply service	Food production Raw material production	Equivalent factor method Equivalent factor method
Support service	Maintaining the soil Maintaining biodiversity	Equivalent factor method Equivalent factor method
Cultural service	Recreation Scientific research and education Cultural heritage Appreciation of real estate	Travel cost method (TCM) Benefit transfer method Contingent valuation method (CVM) Contingent valuation method (CVM)
Service cost	Direct cost Opportunity cost Other costs	Benefit transfer method Benefit transfer method Benefit transfer method

3. Results

3.1. Calculation Results

3.1.1. The Value of Ecosystem Regulatory, Supply, and Support Services

We used the equivalent value W_i of the per unit area ecosystem service value of the Chinese wetland ecosystem as the value of the Xixi National Wetland ESs (Table 2) [31]. According to the data from the 2017 Hangzhou Statistical Yearbook, in 2016, grain in Hangzhou was planted on 107,990 hm^2, the output was 635.975 million kilograms, and the price was RMB 2370.16 million. The V_{crop} calculated by Formula (4) is 3135.42 RMB/hm^{-2}. We used Formula (6) to calculate its V_i and Formula (5) to introduce the wetland park area of 10.08 km^2 to calculate the value of its ecosystem adjustment, supply, and support services in 2016 (Table 3).

Table 3. Value of ecosystem adjustment, support, and supply services for the Xixi National Wetland Park (2016).

Class of Service	Measurement Index	Ecosystem Service Value Equivalent of Unit Area (Wi)	Ecosystem Service Value of Unit Area (V_i) (RMB/hm^{-2}·a^{-1})	Individual Service Value (EV_i) (10,000 RMB·a^{-1})	Total Value of Classification (Ten Thousand RMB·a^{-1})
Adjustment service	Gas adjustment	2.41	7556.36	761.68	13,843.0
	Climate adjustment	13.55	42,484.94	4282.48	
	Hydrological adjustment	13.44	42,140.04	4247.72	
	Waste treatment	14.40	45,150.05	4551.12	
Support service	Maintaining the soil	1.99	6239.49	628.94	1795.17
	Maintaining biodiversity	3.69	11,569.70	1166.23	
Supply service	Food production	0.36	1128.75	113.78	189.63
	Raw material production	0.24	752.50	75.85	

3.1.2. The Value of Ecosystem Cultural Services

(1) The value of real estate appreciation

We determined the HV of Xixi National Wetland Park in 2016 was approximately RMB 10010 million by using Formula (7) (detailed data are shown in Table 4).

Table 4. The appreciation of Xixi National Wetland Park property value (HV) (2016).

Residential Category	Covered Area (A_i) (Ten Thousand/m^2)	WTP Median (HP_i) (RMB/m^2)	Appreciation (Ten Thousand RMB·a^{-1})	Total Appreciation (Ten Thousand RMB·a^{-1})
Low-rise residence	89.0	8000.0	712,000.0	1,001,000.0
Multistory residence	115.5	2000.0	231,100.0	
High-rise residence	19.3	3000.0	57,900.0	

(2) The value of cultural heritage

Using Formula (8) to calculate the 2016 NV of Xixi National Wetland Park yielded RMB 3760,803,900 (RMB 3.76 billion). Additionally, according to the statistical results of the questionnaire, among the respondents who chose to pay, the selection ratios of SV, BV, and CV were 3.3%, 14.3%, and 82.4%, respectively, and the selection value of the NV of Xixi National Wetland Park in 2016 was calculated. The values of the selection, heritage, and existence of Xixi National Wetland Park were RMB 124,106,500, RMB 537,795,000, and RMB 3098,902,400, respectively (detailed data are shown in Table 5).

Table 5. Cultural heritage value of Xixi National Wetland Park (NV) (2016).

Cultural Heritage Value Category	Ratio of Willing to Pay	Itemized Value (Ten Thousand RMB)	Cultural Heritage Value (NV) (Ten Thousand RMB)
SV	3.3%	12,410.65	376,080.39
BV	14.3%	53,779.50	
CV	82.4%	309,890.24	

(3) The value of recreation

I. Traveling cost

First, using Formula (11), the JC value of Xixi National Wetland Park in 2016 was calculated as RMB 391,263,800 (detailed data are shown in Table 6).

Table 6. Journey cost for tourists to Xixi National Wetland Park (JC) (2016).

Travel Partition	Sample Visitor	Sample Traveling Ratio	Number of Tourists (Ten Thousand) (V_i)	Partition Population (Ten Thousand) (P_i)	Round Trip Transportation Fee (T_i) (RMB)	Partition Traveling Ratio (TR_i)	Partition Transportation Cost (Ten Thousand RMB)
Hangzhou	75	16.38	81.42	918.8	4.0	8.86	176.23
Zhejiang Province (except Hangzhou)	58	12.66	62.96	4671.2	161.0	1.35	1078.96
Shanghai	46	10.04	49.94	2420	256.0	2.06	2626.41
Jiangsu Province	26	5.68	28.22	7999	317.0	0.35	556.13
Anhui Province	21	4.59	22.80	6196	470.0	0.37	859.78
Jiangxi Province	14	3.06	15.20	4592	265.0	0.33	436.07
Shandong Province	33	7.21	35.82	9947	537.0	0.36	961.56
Liaoning Province	8	1.75	8.68	4378	1228.0	0.20	1211.13
Hunan Province	21	4.59	22.80	6822	1074.0	0.33	1784.40
Guangdong Province	16	3.49	17.37	11,000	1008.0	0.16	791.35
Heilongjiang Province	2	0.44	2.17	3799	1298.0	0.06	368.82
Beijing	8	1.75	8.68	2173	1026.0	0.40	2038.72
Hubei Province	9	1.97	9.77	5885	518.0	0.17	427.57
Fujian Province	2	0.44	2.17	3874	516.0	0.06	143.78
Sichuan Province	16	3.49	17.37	8262	1514.0	0.21	1582.49
Chongqing	12	2.62	13.03	3048	1180.0	0.43	2507.42
Shanxi Province	8	1.75	8.68	3682	766.0	0.24	898.29

Table 6. *Cont.*

Travel Partition	Sample Visitor	Sample Traveling Ratio	Number of Tourists (Ten Thousand) (V_i)	Partition Population (Ten Thousand) (P_i)	Round Trip Transportation Fee (T_i) (RMB)	Partition Traveling Ratio (TR_i)	Partition Transportation Cost (Ten Thousand RMB)
Henan Province	18	3.93	19.54	9532	516.0	0.20	525.92
Hebei Province	12	2.62	13.03	7470	602.0	0.17	521.96
Inner Mongolia Autonomous Region	10	2.18	10.86	2520	1208.0	0.43	2587.29
Shanxi Province	6	1.31	6.51	3813	864.0	0.17	733.80
Yunnan Province	2	0.44	2.17	4771	1450.0	0.05	328.07
Jilin Province	4	0.87	4.34	2733	1502.0	0.16	1186.51
Tianjing	12	2.62	13.03	1562	736.0	0.83	3051.81
Gansu Province	2	0.44	2.17	2610	1180.0	0.08	488.03
Xinjiang Autonomous Region	7	1.53	7.60	2398	2872.0	0.32	4524.94
Guangxi Province	4	0.87	4.34	4838	658.0	0.09	293.63
Guizhou Province	2	0.44	2.17	3555	705.0	0.06	214.07
Ningxia Province	2	0.44	2.17	674	2100.0	0.32	3363.32
Qinghai Province	2	0.44	2.17	593	1570.0	0.37	2857.95

Second, using Formula (14), the other costs of tourists in the Xixi National Wetland Park in 2016 on nonfestival and festival days were calculated as RMB 705,930,200 and RMB 818,454,300 RMB, respectively; the OC value was RMB 1524,384,500.

So, according to Formula (10), the TC was RMB 1915,648,300 for the Xixi National Wetland Park in 2016.

II. Traveling time value

Using Formula (15), the TV of Xixi National Wetland Park in 2016 was RMB 350,779,900 (detailed data is shown in Table 7).

Table 7. Traveling time value of tourists attending the Xixi National Wetland Park (TV) (2016).

Travel Partition	Transportation	Round Trip Transportation Time (JT_i) (h)	Recreational Time (VT_i) (h)	Opportunity Salary (OPT_i) (RMB/h)	Number of Tourists (TT_i) (Ten Thousand)	Partition Travel Time Value (Ten Thousand RMB)
Hangzhou	Bus	1	3	8.77	81.42	2855.36
Zhejiang Province	High-speed rail	2	3	7.94	62.96	2498.47
Shanghai	Self-driving	4	3	9.69	49.94	3388.17
Jiangsu Province	High-speed rail	4	3	6.75	28.22	1332.82
Anhui Province	High-speed rail	7	3	4.90	22.80	1116.71
Jiangxi Province	Local train	17	3	4.82	15.20	1464.28
Shandong Province	Local train	33	3	5.71	35.82	7369.58
Liaoning Province	Aircraft	4	3	5.52	8.68	335.78
Hunan Province	Aircraft	3	3	5.26	22.80	718.93
Guangdong Province	Aircraft	4	3	6.33	17.37	769.79
Heilongjiang Province	Aircraft	7	3	4.32	2.17	93.88
Beijing	Aircraft	5	3	9.62	8.68	668.56
Hubei Province	Local train	34	3	4.94	9.77	1784.76
Fujian Province	Motor train	12	3	6.05	2.17	197.05

Table 7. *Cont.*

Travel Partition	Transportation	Round Trip Transportation Time (JT_i) (h)	Recreational Time (VT_i) (h)	Opportunity Salary (OPT_i) (RMB/h)	Number of Tourists (TT_i) (Ten Thousand)	Partition Travel Time Value (Ten Thousand RMB)
Sichuan Province	Aircraft	5	3	4.76	17.37	661.96
Chongqing	Aircraft	4	3	4.97	13.03	453.64
Shanxi Province	Aircraft	4	3	4.60	8.68	279.36
Henan Province	Local train	29	3	4.58	19.54	2860.95
Hebei Province	Local train	38	3	4.75	13.03	2534.91
Inner Mongolia Autonomous Region	Aircraft	5	3	5.54	10.86	481.14
Shanxi Province	Aircraft	4	3	4.78	6.51	217.86
Yunnan Province	Aircraft	6	3	4.81	2.17	93.93
Jilin Province	Aircraft	7	3	4.46	4.34	193.55
Tianjing	Aircraft	4	3	6.23	13.03	568.54
Gansu Province	Aircraft	6	3	4.32	2.17	84.35
Xinjiang Autonomous Region	Aircraft	10	3	4.78	7.60	472.41
Guangxi Province	Local train	39	3	4.76	4.34	867.88
Guizhou Province	Local train	53	3	4.49	2.17	546.28
Ningxia Province	Aircraft	5	3	4.56	2.17	79.24
Qinghai Province	Aircraft	6	3	4.50	2.17	87.84

III. Surplus value of consumer

According to Formula (16), the TS of Xixi National Wetland Park in 2016 was RMB 76,625,300.

Finally, using Formula (9), the RV of Xixi National Wetland Park in 2016 was RMB 3,032,687,500.

(4) The value of scientific research and education

Using Formula (17), the SV of Xixi National Wetland Park in 2016 is RMB 11.4206 million.

In summary, the ecosystem cultural service value of Xixi Wetland is 16,814.912 million yuan.

3.1.3. Ecosystem Service Cost

Based on the calculation of Formula (18) and the park operation cost, the total cost of providing services for the Xixi Wetland National Park ecosystem in 2016 was RMB 34,815,800.

We calculated that the VES of Xixi National Wetland Park in 2016 was RMB 169,731.90 million (RMB 16.973 billion), the service cost was RMB 34,815,800, and the NES was RMB 1,693,8374,200 (RMB 16.938 billion). Among them, the cultural service value accounted for the majority of its ES value: 99.27% of its NES ratio; property appreciation, cultural heritage, and recreational leisure were the top three services accounting for its cultural service value, totaling RMB 16803,490,000 (RMB 168.03 billion) (detailed data are provided in Table 7). These data show that the performance of the protective development of Xixi Wetland was substantial.

3.2. Scenario Analysis

We also set a contrast scenario. In Scenario I, the Xixi Wetland implements a protective development model (a model adopted in reality, which we calculated as described above); this is a "protective development scenario". Xixi Wetland Park will be built according to protection and use, being protection-oriented, with moderate development. In Scenario II, for the Xixi Wetland, a single protective mode is implemented; this is a "protection" scenario. Xixi Wetland will be managed with closed protection, no entry, and a comprehensive enclosure. To simplify ES value calculations, avoid double counting, and efficiently compare scenarios, we assumed that:

1. In the protection scenario, the index for measuring Xixi Wetland ecosystem service value and service cost is the same as that of protective development.
2. In the protection scenario, the health and performance of the Xixi Wetland Ecosystem is restored to (must not be lower than) the health and performance of the Xixi Wetland Ecosystem in the protective development scenario. In the protective development scenario, its service value of co-system regulation, supply, and support is equal to (must not be lower than) the corresponding value in the context of protective development.
3. In the protection scenario, the Xixi Wetland adopts the measures of closed protection, so the values of recreational leisure and scientific research in its cultural services are zero.
4. In the protection scenario, the Xixi Wetland gradually evolves into a beautiful urban secondary wetland; the cultural heritage value and property appreciation in its cultural services are consistent with the protective development scenario.
5. In the protection scenario, the ES cost of Xixi Wetland is RMB 28.57 million, from which the labor cost and public and office costs of the management and operation of the wetland park have been subtracted (protective development scenario).

In the protection scenario, the VES of the Xixi Wetland in 2016 was RMB 13.929 billion, the service cost was RMB 28,570,800, and the NES was RMB 13.901 billion. Similarly, the value of cultural services (only including cultural heritage values and property appreciation) was RMB 13.771 billion, which was the main component of its ES value. Compared with the protective development scenario, the Xixi Wetland provided an increase of RMB 3,037 million in terms of NES to the urban wetland park. This was only the increased NES value in 2016; that is, the performance of the conservation development of the Xixi Wetland resources was much better than that provided with single protection (detailed data are shown in Table 8).

Table 8. VES, service cost, and NES of Xixi National Wetland Park under protection development and protection scenarios (ten thousand RMB·year^{-1}) (2016).

Class of Service	Measurement Index	Single Value		Classified Value	VES	Service Cost	NES
		Scenario I	Scenario II	I/II	I/II	I/II	I/II
Adjustment service	Gas regulation	761.68	Same	13,843.0/ 13,843.0	RMB 16.973 billion/ RMB 13.929 billion	3481.58/ 2857.08	RMB 16.938 billion/ RMB 13.901 billion
	Climate regulation	4282.48	Same				
	Hydrological regulation	4247.72	Same				
	Waste treatment	4551.12	Same				
Supply service	Food production	113.78	Same	189.63/ 189.63			
	Raw material production	75.85	Same				
Support service	Maintaining the soil	628.94	Same	1795.17/ 1795.17			
	Maintaining biodiversity	1166.23	Same				
Cultural service	recreation	303,268.75	0.0	RMB 16.814 billion/ RMB 13.771 billion			
	Scientific research and education	1142.06	0.0				
	Cultural heritage	376,080.39	Same				
	Property appreciation	1,001,000.0	Same				

To further analyze the NES data, the VES in the protection development and the protection scenarios in the Xixi Wetland was divided into direct explicit value (earnings) and indirect hidden value (earnings) (detailed data are provided in Table 9). In addition, small supply service value provided by the Xixi Wetland (Park) ecosystem after repair and protection in both scenarios (RMB 1.8963 million in 2016), compared with the protection scenario in the context of protective development, the value of recreation, education, and scientific research, increased RMB 3,044 million. This value is direct explicit value (earnings) that are convenient for quantitative calculations; this is the direct income that can be obtained (or partially obtained) by the construction, management, or operation departments or institutions of urban wetland parks.

Table 9. Comparison of VES in Xixi National Wetland Park under protective development and protective scenarios (ten thousand RMB) (2016).

Analysis Category	Service Type	Measurement Index	Protective	Protective Development
Direct dominant value (income)	Supply		RMB 1.8963 million	RMB 1.8963 million
	Cultural	Recreation	RMB 0.0	RMB 3.033 billion
		Scientific research and education	RMB 0.0	RMB 11.4206 million
Indirect dominant value (income)	Adjustment support		RMB 13.927 billion	RMB 13.927 billion
	Cultural	Cultural heritage Property appreciation		
Cost–benefit analysis			Cannot balance	Prominent net income

In both scenarios, the value of the adjustment, support, and cultural property and cultural heritage services with the cultural services was RMB 13.927 billion in the Xixi Wetland Park after repair in 2016; however, these values are the positive effect values provided by healthy wetland ecosystems and its indirect hidden benefits that are not easily quantifiable. Under the current system, urban wetland (park) resource management, maintenance, or operation departments or institutions cannot charge these implicit positive values or obtain compensation for the positive external effects.

In the context of protective development, the service cost of Xixi Wetlands' ESs in 2016 was RMB 34.8158 million; in the case of protection, the cost was RMB 28.5708 million. Under the protection scenario, the management, maintenance, or operation department or organization of Xixi Wetland Resources could not obtain economic benefits or compensation from the market or could obtain only minimal income or compensation through supplying services (RMB 1,896,300, accounting for 5.4% of the service costs). The cost of providing ecosystem services to wetlands basically requires financial commitment from the government. However, in the context of protective development, the cost of ecosystem services can be easily balanced through the market-based income from leisure, education, and scientific research; a considerable dominant net income of approximately RMB 3009 million can be earned.

4. Discussion

In general, we assessed the NES of Xixi Wetland services under a protective development policy by analyzing the data from 2016, and the results are encouraging. For Hangzhou, the protective development of Xixi Wetland has produced substantial benefits. As proposed by Chuma et al., the construction of constructed wetlands is conducive to the comprehensive development of a city [45]. The comprehensive protection project of Xixi Wetland has contributed to the green development of Hangzhou and become a model for other wetland park construction [24]. In addition, if the statistics of a certain number of years or the life cycle of the ecological product are considered, the advantages of the protective development model will be enhanced.

In terms of the proportions of VES in Xixi Wetland, VES in Xixi Wetland is reflected mainly in cultural services, which is consistent with the current research results. According to the research conclusion of Xiao Tao et al., the cultural services of Xixi Wetland ecosystem account for 88.15% of the total ecosystem services [46]. On the other hand, compared with Hemu Wetland, which is also in Hangzhou but adopts the original protection mode, the total value of ecosystem services of Xixi Wetland is more than 10 times that of Hehe Wetland thanks to the protective development policy, and it focuses mainly on cultural services, which is also consistent with the results of situational analysis in our research. Therefore, from a comparative point of view, it is recognized that the conservation development of Xixi Wetland has achieved greater benefits in Hangzhou.

From the calculation results of VES, the VES measured in this study is RMB 16.973 billion in Xixi Wetland, which is larger than the conclusion of some current studies [47]. Existing studies pay more attention to Xixi Wetland itself, so the measurement of its externality is lacking. In order to study whether Xixi Wetland has achieved positive benefits by adopting the protective development mode, the external effects of Xixi Wetland should also be taken into account. Therefore, this study included real estate value appreciation and other indicators into the calculation of VES, resulting in a calculation result larger than that of general studies.

From the calculations of the NES, although the protective development model of the Hangzhou Xixi Wetland is successful, some particularities should be considered. First, the Xixi Wetland is located in Hangzhou, a city with economic strength and popular tourist attractions. Second, the Xixi Wetland is located in the downtown area of Hangzhou. For example, due to the change in renewable energy transmission in Sanheyuan National Park due to the policies for facilities and space restrictions, some local communities have lost their advantages in terms of renewable energy use, so some of them are likely to fall into poverty again [8]. Therefore, the choice of urban wetland resource management approaches needs to be realistic and tailored to local realities. The NES advantages or direct dominant net income of the wetland park model may not be achieved in all cities.

In addition, in the calculation of the direct cost of the ESs of the Xixi National Wetland Park, considering the life cycle of ecological products, the capital cost of Xixi Wetland restoration and park construction was not calculated (requires amortization over time). We calculated only the cost of park maintenance and operation after the restoration of the wetland and the park construction are completed. Although this will result in low service cost results, the overall study conclusions would not be affected. Due to the lack of comprehensive data, for the values of factors in the equivalent factor method and the benefit transfer method that we used in the calculation process, we directly referred to the relevant literature; this would have affected the accuracy of the findings. However, the study results remain valuable, guiding people in understanding and paying attention to the economic attributes of urban ecological resources, so that governance decisions for urban ecological resources can be scientifically made.

VES dynamically changes. For example, with the increases in people's travel and leisure demand and ability to pay, the recreational value of Xixi National Wetland Park will increase as the number of tourists and the tourist rate increase. With the improvement in people's understanding of the importance of ecological environment (landscape) resources, the property appreciation and cultural heritage value of Xixi National Wetland Park, as calculated by the hypothesis assessment method, will further increase. Evidence shows that different levels of education will lead to different attitudes of different social groups toward wetland protection, thus promoting or hindering the governance of urban wetland resources. Therefore, taking a more scientific and long-term view of the protection and development of wetlands will help us make more scientific decisions on the management of urban wetland resources.

5. Conclusions

According to the calculation and analysis results, we concluded that for the Xixi Wetland, the protective development model adopted in the reality is a more practical and sustainable protection method for the wetland and for government public finances. Given the market conditions in Hangzhou, the protective development model has marketized the VES of Xixi Wetland, which has considerably increased the NES. Therefore, in practice, we suggest that wetland development should be combined with urban demand to maximize the market-oriented income of urban wetland resources and realize a virtuous cycle between urban development and wetland protection.

Finally, on the basis of a large number of VES assessments, this study takes Xixi Wetland as an example and considers the cost of ecosystem services to construct the research framework of NES assessment, which more intuitively shows the status quo of wetland ecosystem protection and development, and it provides a new direction for wetland ecosystem research. Future research on the NES of urban wetlands can include more in-depth studies on the dynamic changes in the net value of wetland services. Through the investigation of data from different years, we can calculate and compare the law of the change in the NES of wetland ecosystem services over a period of time, more scientifically understand the law of wetland resources protection and development, and guide the practices of wetland resources protection and development.

Author Contributions: Conceptualization, S.Z. and L.D.; data curation, Z.C.; investigation, Z.C; methodology, W.L.; resources, S.Z.; visualization, W.L.; writing—original draft preparation, W.L.; writing—review and editing, S.Z. All authors have read and agreed to the published version of the manuscript.

Funding: This study was funded by the Zhejiang Provincial Natural Science Foundation of China (General Program), grant number LY18C160007).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data that support the findings of this study are available from the websites described in the Study Data section.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Dai, J.H.; Wang, H.J.; Wang, H.L.; Chen, C.Y. Theoretical Framework of Ecosystem Service Value Assessment and Ecological Compensation Practice. *Prog. Geogr.* **2012**, *7*, 963–969.
2. Xie, G.D.; Zhang, C.X.; Zhang, L.M.; Chen, W.H.; Li, S.M. Improvement of the Method of Ecosystem Service Value Based on Unit Equivalent Value Equivalent Factor. *J. Nat. Resour.* **2015**, *8*, 1243–1254.
3. Costanza, R.; Arge, R.; Groot, R. The value of the world's ecosystem service and natural capital. *Nature* **1997**, *387*, 253–260. [CrossRef]
4. Lv, Y.H.; Zhang, L.W.; Wang, J.L. Assessment of ecosystem and its service protection: Indicators and methods. *Chin. J. Appl. Ecol.* **2013**, *24*, 1237–1243.
5. Davide, G. Ecosystem services in environmental impact assessment and strategic environmental assessment. *Environ. Impact Assess. Rev.* **2013**, *40*, 1–2.
6. Bockstael, N.E.; Michael, H.W.; Kling, C.L. Estimating the value of water quality improvements in a recreational demand framework. *Water Resour. Res.* **1987**, *23*, 951–960. [CrossRef]
7. Buckley, R. The economics of ecosystems and biodiversity: Ecological and economic foundations. *Austral Ecol.* **2011**, *36*, e34–e35. [CrossRef]
8. Ehrilich, P.R.; Ehrilich, A.H. *Extinction: The Causes and Consequences of the Disappearance of Species*; Victor Gollancz: London, UK, 1982; pp. 113–126.
9. Silvia, R.; Andrea, A.; Laura, P. Integrating green infrastructure into spatial planning regulations to improve the performance of urban ecosystems. Insights from an Italian case study. *Sustain. Cities Soc.* **2020**, *53*, 101907.
10. Srikanta, S.; Chakraborti, S.; Joshi, P.K.; Keesstra, S.; Sen, S.; Paul, S.K.; Kreuter, U.; Sutton, C.P.; Jha, S.; Dang, B.K. Ecosystem service value assessment of a natural reserve region for strengthening protection and conservation. *J. Environ. Manag.* **2019**, *244*, 208–227.
11. Huang, S.; He, Y.; Yang, Z.; Ju, P.; Yang, X.; Wang, K.; Feng, Y.; Chen, H.; Wu, N. Construction of ecosystem service value evaluation system for Longquanshan Urban Forest Park in Chengdu: Based on Analytic Hierarchy Process. *Chin. J. Appl. Environ. Biol.* **2022**, *28*, 1635–1645.
12. Wang, S.; Yang, G.; Xu, C.; Li, M. Evaluation of ecosystem service value of mountain urban green space: A case study of Zunyi City center. *Sci. Environ. Prot.* **2023**, 1–10. [CrossRef]
13. Shen, R.; Xiao, G. Evaluation of ecosystem services in Wuyi Mountain National Park. *Ecol. Sci.* **2023**, *42*, 58–65.
14. Daily, G.C.; Polasky, S.; Goldstein, J. Ecosystem services in decision making: Time to deliver. *Front. Ecol. Environ.* **2009**, *7*, 21–28. [CrossRef]
15. Burkhard, B.; Petrosillo, I.; Costanza, R. Ecosystem services: Bridging ecology, economy and social sciences. *Ecol. Complex.* **2010**, *7*, 257–259. [CrossRef]
16. Uta, S.; Davide, M.; Angelo, M.; Margherita, P. Positive effects of payments for ecosystem services on biodiversity and socio-economic development: Examples from Natura 2000 sites in Italy. *Ecosyst. Serv.* **2018**, *34*, 96–105.
17. Yin, R.S.; Sedjo, R.; Liu, P. The potential and challenges of sequestering carbon and generating other services in China's forest ecosystems. *Environ. Sci. Technol.* **2010**, *44*, 5687–5688. [CrossRef]

18. Chen, Z.M.; Chen, G.Q.; Chen, B. Net ecosystem services value of wetland: Environmental economic account. *Commun. Nonlinear Sci. Numer. Simul.* **2009**, *14*, 2837–2843. [CrossRef]
19. Guo, Z.; Xiao, X.; Gan, Y. Ecosystem functions, services and their values—A case study in Xingshan County of China. *Ecol. Econ.* **2001**, *38*, 141–154. [CrossRef]
20. Zhang, X.Q.; Cao, G.J. Urban water environmental quality problems and improvement measures. *Urban Probl.* **2005**, *4*, 35–38.
21. Zhang, S.F.; Dong, L.; Huang, C.D. A Comprehensive Cost-benefit Analysis Method for the Evaluation of Green Infrastructure Economic Benefits: A Case Study of Philadelphia, USA. *Chin. Landsc. Archit.* **2016**, *32*, 116–121.
22. Kinzig, A.P.; Perrings, C.; Chapin, F.S.; Polasky, S.; Smith, V.K.; Tilman, D.; Turner, B.L. Response—Ecosystem services: Free lunch no more. *Science* **2012**, *335*, 656–657. [CrossRef]
23. Paul, A.S.; William, D.N. *Microeconomics*, 3rd ed.; McGraw-Hill Inc.: New York, NY, USA, 1989; pp. 76–135.
24. Xie, H. A poem and a painting of Fifteen Years of Misty Rain in Xixi—On the Road of ecological protection and utilization of Xixi Wetland in Hangzhou. *Zhejiang Land Resour.* **2020**, *207*, 12–13.
25. Liu, G.; Wang, B.; Li, Z.; Wu, M. Ecological engineering benefit evaluation of urban wetland based on ecosystem services: A case study of Xixi National Wetland Park. *Zhejiang For. Sci. Technol.* **2016**, *36*, 77–81.
26. Fu, X.E.; Qian, D.; Han, L.B.; Zhang, K.Y. Research on Evaluation of Urban Green Infrastructure Benefit Based on Total Economic. *Value Constr. Econ.* **2015**, *36*, 83–86.
27. Ouyang, Z.Y.; Wang, X.K.; Miao, H. Preliminary Study on the Service Function of Chinese Terrestrial Ecosystem and Its Eco-economic. *Value Acta Ecol. Sin.* **1999**, *5*, 19–25.
28. Siberman, J.; Andereck, K.L. The economic value of off-high-way vehicle recreation. *J. Leis. Res.* **2006**, *38*, 208–223.
29. Tyrvaine, L.; Miettinen, A. Propeny Prices and Urban Forest Amenities. *J. Environ. Econ. Manag.* **2000**, *9*, 205–223. [CrossRef]
30. Russell, K. *Lake Drawdown: A Debate on the Value of 2 Inches of Water*; University of Wisconsin Whitewater: Whitewater, WI, USA, 2007.
31. Jim, C.Y.; Chen, W.Y. Extemal effects of neighborhood parks and landscape elementson high-rise residential value. *Land Use Policy* **2010**, *27*, 662–670. [CrossRef]
32. De Groot, R.S.; Wilson, M.A.; Boumans, R.M.J. A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecol. Econ.* **2002**, *41*, 393–408. [CrossRef]
33. Crompton, J.L. The impact of parks on property values: A review of the empirical evidence. *J. Leis. Res.* **2001**, *33*, 1–31. [CrossRef]
34. More, T.A.; Stevens, T.; Allen, G. Valuation of urban parks. *Landsc. Urban Plan.* **1988**, *15*, 139–152. [CrossRef]
35. Brown, W.G.; Nawas, F. Impact of Aggregation on the Estimation of Outdoor Recreation Demand Functions. *Am. J. Agric. Econ.* **1973**, *55*, 246–249. [CrossRef]
36. Pushpam, K. *The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations*; McGraw-Hill Inc.: New York, NY, USA, 2011; pp. 165–177.
37. Venkatachalam, L. The Contingent Valuation Method: A review. *Environ. Impact Assess. Rev.* **2004**, *24*, 89–124. [CrossRef]
38. Kou, H.Y.; Zhu, L.Q. Basic research on the external economic effects of urban green space. *Chin. Landsc. Archit.* **2006**, *12*, 77–79.
39. Crompton, J.L. The impact of parks on property values: Empirical evidence from the past two decades in the United States. *Manag. Leis.* **2005**, *10*, 203–218. [CrossRef]
40. Nicholls, S.; Crompton, J.L. The impact of greenways on property values: Evidence from Austin. *Tex. J. Leis. Res.* **2005**, *37*, 321–341. [CrossRef]
41. Zhang, B.; Wang, Y.P.; Xie, G.D. A Summary of Studies on Urban Green Space Resources Affecting Property Value. *Ecol. Sci.* **2013**, *32*, 660–667.
42. Pearce, D.; Moran, D. *The Economic Value of Biodiversity IUCN*; Earthscan Publications: London, UK, 1994; pp. 25–45.
43. Gum, R.L.; Martin, W.E. Problems on Solutions in Estimating the Demand for and Value of Rural Outdoor Recreation. *Am. J. Agric. Econ.* **1974**, *56*, 558–566. [CrossRef]
44. Dong, X.W.; Zhang, J.; Zhang, J.L. A Review of Several Issues in the Evaluation of Tourism Resources Value by Travel Expenses. *J. Nat. Resour.* **2011**, *26*, 1983–1997.
45. Zhao, L.; Wang, E.D. An Empirical Study on the Method of Natural Resource Benefit Transfer Based on Meta-analysis. *Resour. Sci.* **2011**, *33*, 31–40.
46. Xiao, T.; Shi, Q. Effects of management methods on ecosystem service value of urban wetland: A case study of Xixi Wetland and Hemu Wetland in Hangzhou. *Wetl. Sci. Manag.* **2002**, *18*, 51–55.
47. Pan, M.; Li, X.; Hu, T.; Hao, Y. Dynamic evolution and tradeoff relationship of urban wetland ecosystem services: A case study of Xixi Wetland in Hangzhou, China. *J. Beijing Norm. Univ. (Nat. Sci. Ed.)* **2022**, *58*, 893–900.