Research Article

Landscape Evaluation of Forest Park Based on Analytic Hierarchy Process

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Road ecological landscape construction is an important part of creating an ecological garden city, and it is also an indispensable link in urban garden landscape planning. Taking a national forest park in a certain area as the research object, using the analytic hierarchy process, taking into account the ecological and landscape benefits, we selected 6 parameters: carbon sequestration, dust retention, humidification, plant aesthetic benefits, plant ornamental benefits, and roadside landscape integration. The main indicators construct the forest park landscape resource quality evaluation system. The results show that the comprehensive evaluation score of the national forest park landscape resource quality in this area is 82.36 points, which is in line with the first-level standard in the evaluation system, indicating that the quality of the scenic resources in the park is high and it has unique tourism development value, which can scientifically and reasonably develop forest ecology tourism. In addition, the evaluation system proposed in this article can objectively reflect the value of the park’s ecological whirlpool and the basic conditions for carrying out ecotourism according to the key index factors that affect the quality of scenic resources and provide a scientific and reliable reference for the high-quality development of forest parks.

1. Introduction

In recent decades, people’s desire for the natural beauty of forests has grown more urgent as civilization has evolved. The function of forest landscapes has also grown more significant, as has the evaluation of the benefits of forests to the landscape as a whole. When it comes to landscape benefit evaluation, the process involves assessing the health of a landscape’s natural attributes and its visual aesthetic significance in order to provide positive recommendations for its protection and development. Evaluation is a judging action that assesses whether or not the value object is capable of meeting the demands of the value subject and the extent to which it is capable of meeting those needs. They must have knowledge of the value object’s properties, nature, and laws in order to perform the function. Essentially, the purpose of landscape benefit evaluation is to comprehend the essential components and their relationships with one another while grasping the unchanging laws of landscape expressed in a variety of genuine feelings and changing purposeful sentiments and their relationships with one another [1–4].

One of the most beautiful national forest parks in Hunan Province is located in the city of Jishou, which is home to a national forest park known as Jishou National Forest Park. These woods, which have an 87.1 percent tree covering rate, were established in 2013 under the jurisdiction of the former State Forestry Administration and have been in operation ever since. According to the park’s landform, it is characterized by low-mountain hilly terrain, with the highest peak rising to 779.4 meters above sea level and the lowest peak falling to 185.1 meters above sea level. The topography is undulating, with greater altitudes in the north and lower altitudes in the south due to the influence of the ocean. The annual average temperature in the humid subtropical monsoon climate zone is 17.3 degrees Celsius, the annual average rainfall is 1419.3 millimeters, the annual average sunlight length is 1444.2 hours, and the annual frost-free period is 299 days. Three vegetation type groups, seven
vegetation types, and twenty-one vegetation groups may be found in the park, as well as three vegetation types. The major flora type in the park is subtropical evergreen broad-leaved forest, with a few patches of tropical evergreen broad-leaved forest. There are 1,305 species of vascular plants divided into 178 families and 575 genera, as well as 33 species of protected plants, which include 4 species of national-level protected wild plants, 14 species of national-level protected wild plants, and 15 species of orchids, all of which are listed in CITES Appendix II. There are 178 families and 575 genera, as well as 33 species of protected plants. There are 178 families, 575 genera, and 33 species of plants that are protected in the United States. In terms of wild animal resources, the park boasts a rich assortment [5, 6]. As of now, there are 33 species of fish and 195 different types of terrestrial creatures known to exist on Earth. Currently, there are 21 species of national class II key protected wild animals, and there are an additional 141 species of wild animals that are beneficial to national protection or have considerable economic and scientific significance that are also protected under national legislation. Terrestrial fauna with scientific significance can be found here.

Ecological garden cities are essential for the long-term development of a healthy environment and the preservation of urban ecological equilibrium in urban settings. The design of the urban garden landscape and the optimization of the urban ecological environment are both key parts of the development of an ecological garden city in the making. In the urban ecological landscape system, street trees are one of the most significant components since they not only beautify the road scape but also give ecological benefits such as dust suppression and noise reduction, cooling, and humidification. By monitoring the growth of street trees and analyzing the benefits of urban ecological landscape planning, city managers may develop more appropriate urban ecological landscape designs and better build ecological garden cities. Obtaining information about street trees can be accomplished through manual measuring, drone photography, and radar scanning, among other methods. Some researchers were able to quickly capture 3D point cloud data of street trees and generate parameter information by using automobile lidar, according to their findings. In contrast, while scanning with a vehicle-mounted lidar, the data quality is influenced by the vehicle's speed, and the incompleteness rate of the point cloud is substantial. Missing canopy data can account for more than half of all data points, and the large area covered by the discrete point cloud makes identifying the attributes of the street tree more difficult [7–9].

As an active remote sensing approach, TLS can capture high-density point cloud data in a short period of time. The steady collection platform assures high-quality data collection, while also providing considerable advantages in terms of accurately recovering the vertical structure of stand structures. Multiple studies have demonstrated that TLS data can be regarded as real values, and they can be used to estimate the benefits of vegetation ecological landscapes and conduct evaluation and analysis, thereby saving a significant amount of human resources for field investigation. The evaluation variables for highways are specified, and some researchers use alternative weight calculation models based on the evaluation variables to construct an evaluation system for highways based on landscape optimization, ecological effect, and health in order to make optimization suggestions. When tree structure parameters are extracted, they can be used as the basis for building an assessment index model, which can then be used as a quantitative index to measure ecological landscape differences, making the evaluation results more scientific and reasonable. TLS is used as a research instrument in this article to quantify the ecological landscape benefits of street trees along two highways in the national forest park. Point cloud data is processed and analyzed, and tree attributes are extracted and entered into an evaluation system, which is then evaluated. Data collection and methodology will be assisted by this position.

In the context of ecotourism development, forest landscape resources are defined as forest resources that have a high value for the development of ecotourism and the ecological setting in which they are found. In addition to serving as a necessary precondition for the establishment of forest parks, forest landscape resources also serve as an important means of addressing the public’s growing desire for a beautiful environment. In order to put the concept of “clear lakes and lush mountains are valued assets” into practice, forest ecotourism that is based on high-quality forest scenic resources is an important strategy. Numerous studies on the quality evaluation of forest scenery resources have been conducted both domestically and internationally, and the establishment of an expert school, a psychology school, and an empirical school have all taken place. An evaluation method, which can be either qualitative or quantitative in nature, has also been established. The analytic hierarchy process (AHP) technique is used to combine qualitative and quantitative evaluations and incorporate regional environmental quality and basic prerequisites for tourist development into the forest landscape resource quality evaluation index system, which is part of the Forest Landscape Resource Quality Evaluation Index System. This article calculates the weight coefficient by combining the criteria and index layers, and it applies the coefficient to the quality of scenic resources in a national forest park in a specific area. The goal is to provide a scientific foundation for the protection, development, construction, and management of national forest parks while also promoting the high-quality development of national forest parks.

Principle of hierarchical analysis: hierarchical analysis is a system analysis method proposed by American operations researcher Thomas Sethi in the 1970s, which combines qualitative methods with quantitative methods, decomposes complex problems into several levels and several factors, makes a two-by-two comparison between each factor, and finally obtains the weights of different problem-solving solutions to provide the theoretical basis for the best choice
In the 1960s,

Research Progress in Foreign Countries.

Research Status of Landscape Benefit are as follows:

- multiobjective, multicriteria, and multiperiod system evaluation. The basic steps of the hierarchical analysis method are as follows:

  1. Conceptualize the problem to be studied and find out the main factors it contains.
  2. Analyze the affiliation, parallelism, and derivation relationships among the factors and establish an ordered hierarchical model.
  3. Compare the relative importance of each element of the same level to the criterion of the previous level by two and two, and establish a judgment matrix.
  4. Calculate the relative importance of the compared elements to the criterion of the previous level based on the judgment matrix relative weights of the compared elements to the criterion of the upper level and calculate the consistency test of the judgment matrix.
  5. Calculate the synthetic weights of the elements of each level relative to the research problem and derive the computational model of the research problem.

2. Research Status of Landscape Benefit Evaluation at Home and Abroad

2.1. Research Progress in Foreign Countries. In the 1960s, humans began to evaluate landscapes against a backdrop of rapid growth in the world economy, serious depletion of natural resources, and the serious threat posed by environmental visual pollution to people’s physical and mental health; that is when the field of landscape evaluation was born. Around the 1970s, a great variety of landscape evaluation methods, such as the public preference method, the descriptive factor approach, and the beauty degree evaluation method, began to develop in the international community. The landscape resource management system (VMS) developed by the United States Forest Service in 1974 was developed by landscape architecture experts on the assumption that the abstract features of the landscape contain an aesthetic value, particularly formal aesthetic value, and that these features play an important role in protection. Since then, landscape evaluation has gotten increasingly sophisticated in terms of methodologies and technologies, resulting in the formation of four distinct schools of thought: the expert school, the psychophysics school, the cognitive school, and the empirical school. Among the most widely used psychophysics approaches are the beauty degree evaluation method and the comparative evaluation method, both of which are described below. Daniel et al. proposed the beauty evaluation method, and Buhyof et al. proposed a comparison evaluation approach based on the results of the beauty evaluation method. To date, the most extensively used and acknowledged methods in landscape evaluation are these two approaches, which are also the most effective methods in landscape evaluation [11–16].

A great deal of research has been done on forest composition, forest age, tree density, and gap area, as well as thinning intensity and the requirements for tourism space since the 1980s by several international experts. It has been demonstrated in studies that forests with a diverse range of tree species, both dominant and nondominant, as well as complex forest plant structures, have greater aesthetic value and are more valuable as an ornamental resource. Additionally, according to the findings of the study, the beauty degree of the mixed forest is higher than the beauty degree of the pure forest, and the beauty degree of mixed coniferous forest and the mixed broad-leaved forest is higher than the beauty degree of the pure coniferous forest, which is further supported by the findings. There are numerous studies on the landscape benefits of artificial forests being conducted around the world at the moment, with the majority of them focusing on the impact of management methods on the landscape benefits of existing forests, such as the impact of harvesting on the visual quality of the landscape, the impact of operating roads on the landscape vision, and the impact of buildings and other infrastructure on the landscape vision. The impact on the visual quality of the landscape, among other things, is discussed. There are, however, just a few studies on the tree species collocation, seasonal characteristics, layer and color contrast of vegetation communities, and the composition of vegetation communities. Vodak et al. conducted a study on four forms of management in some hardwood stands: clear-cutting, heavy-thinning, light-thinning, and natural forests. They found that clear-cutting, heavy-thinning, light-thinning, and natural forests were the most effective [17–19].

2.2. Domestic Research Progress. In the 1970s, my country’s forest recreation industry developed rapidly, and the study of landscape benefits gradually became the focus of domestic forestry research. In the 1990s, my country introduced the concept of the urban forest, which further promoted the discussion of landscape benefit evaluation by relevant scholars and started a lot of research.

2.2.1. Influence of Tree Species Composition on Landscape. Many studies have been carried out in China, and the “two adherence” principles have been put forward, which are as follows: adhere to suitable trees for the site, primarily good local tree species, and appropriately use other tree species with high ornamental value; insist on mixing different species and multiple tree species to form a diverse sexual landscape; adhere to suitable trees for the site, primarily good local tree species. Some researchers feel that the stability of the community should be taken into consideration while designing the configuration and that 3–5 plants in a clump, 9–2 plants in a block, and 3–5 rows of band-like mixing can be employed. The construction of landscape forests in Bao’an Park has been discussed by other scholars, who have proposed that by transforming forest facies and constructing landscape forests with south subtropical characteristics, it is possible to achieve the healthy and stable development of mountain vegetation, as well as the formation of forests with complete functions, high biodiversity, and high landscape value. Landscape: it is proposed to place
the aesthetics and accessibility at the center of the design, and to build small blocks of different tree species, different densities, different compositions, and different patterns in different sections, as well as to mix multiple tree species, such as needle-broad mix, arbors, and shrubs, to create a beautiful and accessible environment form a kaleidoscopic landscape [20–24].

2.2.2. Scope of Forest Landscape Assessment. On the topic of forest landscape appraisal, there are several theoretical studies and reports that can be found as well. For the most part, Wang Yan and colleagues talked about the formal beauty of forest plants, starting with the natural beauty of plant landscapes, combining distance and scale of aesthetic objects, dividing the landscape into seven levels, which include long-range landscape, close-range landscape, and mid-scape, and expounding their constituent elements, respectively. A combination of qualitative description and quantitative evaluation has been used by some scholars to divide the forest landscape elements of the Maoer Mountain Forest Park in Northeast China into eight major elements, which include landforms, colors, vegetations, water bodies, mosaic degrees, singularities, birds, beasts, and adjacent scenery. On-site scoring was used to assess the beauty of the forest environment in addition to the comprehensive value of nine components of beauty degree. A multiple linear regression model between the beauty degree and each element was developed. For example, some researchers have used the SBE approach to evaluate the shady and sunny slopes of Pinus tabuliformis, thereby offering theoretical and technical assistance for the sustainable management of middle-aged recreational forests in Beijing’s hilly regions. Landscape evaluation was carried out, and a relationship model between the primary landscape aspects (qualitative indicators) and the overall landscape quality was developed and implemented. According to the findings of the study, the landscape quality of artificial forests in Shenzhen is higher than the landscape quality of natural secondary forests [25–27].

2.2.3. Evaluation Method of Landscape Quality. In terms of landscape benefits assessment methods, some scholars maintain that the most generally used methods of landscape evaluation may be split into three categories: survey analysis method, opinion poll method, and intuitive evaluation method, each of which they have described in depth. “Landscape: Culture and Ecology” were published by Yu. According to the book “and perception,” the main schools and methods of landscape resource evaluation are systematically examined, and on the basis of the beauty degree evaluation method and the comparative evaluation method, an incomplete block comparison evaluation method based on a balanced and incomplete block comparison is proposed. Researchers from the Chinese Academy of Sciences have carried out a more extensive study on forest landscape evaluation, systematically developed quantitative evaluation methods for the forest landscape in China, and conducted a detailed analysis of the forest’s natural beauty. The descriptive factor method, which is widely used in China, is primarily concerned with determining the overall beauty value of a landscape by evaluating various characteristics or components of the landscape and then classifying the landscape according to the landscape score obtained. Using a combination of quantitative and qualitative methods, a quantitative model and an AHP are used to evaluate forest landscape resources. Some researchers classify landscape forest landscape into four categories: spring, summer, autumn, and forest landscape. They then utilize the SBE evaluation method to create landscape forests that are appropriate for different seasons and types of landscapes. For the most beautiful evaluation of the forest, researchers employed the landscape evaluation model. They also investigated the applicability of the two evaluation methods, AHP and SBE, in the study of plant landscape units and the right ratio between plant life forms. A considerable degree of consistency is believed to exist between the two evaluation systems. Some domestic scholars have also used radial basis function networks to develop landscape assessment models and to apply RBF networks to forest landscape evaluation, which is a novel concept and method of forest landscape evaluation. It was the first time that some scholars attempted to utilize the rough set theory, and they were successful. They developed an evaluation model for landscape forest aesthetics based on rough set theory, and they presented a new idea of landscape aesthetics index [28, 29].

3. Evaluation Model

A total of two street tree roads of different tree species in the region’s national forest park were selected for data collection in November 2020, and two different tree species were used in the study. The coniferous and broad-leaved mixed road, which was 50 meters in length and contained 13 juniper trees and 12 black poplars, was one of them. The black poplar interspecies has a plant spacing of 5 meters, the broad-leaved road has a length of 100 meters, and the plant spacing is approximately 10 meters, with 31 naked sycamore trees among them.

The RIEGL VZ-400i ground 3D laser scanner was selected based on the characteristics of healthy vegetation development and huge trees on both sides of the specified research road. The RIEGL VZ-400i boasts an ultrahigh laser emission frequency of 1.2 million points per second and an ultrahigh data acquisition speed of 500,000 points per second, which allows it to significantly cut scanning time in the field while still maintaining high accuracy. There is a 5 mm accuracy in the relative measurement, and the distance measurement can go up to 80 meters. Figure 1 depicts the layout of the scanning site prior to scanning.

Splicing is accomplished by the employment of overlapping point clouds between adjacent sites. Following the selection of the splicing environment mode, the program will automatically splice the data in accordance with the permissible error range specified in the environment mode selection. Look for objects that can be used as a reference for splicing.
According to the total evaluation score, the standard for measuring the quality of forest park landscape resources is divided into four grades: First-grade is separated into the range 80–100, second-grade is divided into the range 60–79, third-grade is divided into the range 40–59, and below 40 is graded.

Forest park scenic resources that meet the first-class standard, a stable forest ecosystem, beautiful natural scenery, scenic resources that are highly ornamental and experiential, a high ecotourism value, an excellent regional ecological environment, and favorable fundamental conditions for tourism development are all present. The development and usage of forest ecotourism should be done in a scientific manner in order to ensure its long-term viability and sustainability.

Forest park scenery resources that meet the secondary standard, the forest ecosystem that is relatively stable, the natural scenery that is pleasant, the scenery resources that have a high ornamental experience, the ecological tourism value that is high, the regional ecological environment that is relatively good, and a certain foundation for tourism development are all present and well-developed. The development and usage of forest ecotourism can be carried out scientifically under the presumption of ensuring its long-term viability.

Park landscape resources that meet third-level standards, forest ecosystems in need of strengthening ecological protection and restoration, landscape resources with certain ornamental and experiential properties, and landscape resources with certain ecotourism value are all examples of forest park landscape resources. Carry out scenic tourism activities in a modest manner with the presumption of improvement and improvement.

Forest park landscape resources that satisfy the four-level standard should be focused on increasing the quality and transformation of forest ecosystems, as well as enhancing the ecological environment, in order to meet the requirement. The proper scenic tourism industry can only be developed if forest landscape resources have been improved in both quantity and quality, as previously stated.

Forest levels range from $Y_1$ to $Y_4$ are as follows:

$$Y_1 = b_0 + b_1 x_1 + b_2 x_2 + \ldots + b_p x_p,$$
$$Y_2 = b_0 + b_1 x_2 + b_2 x_2 + \ldots + b_p x_p,$$
$$Y_3 = b_0 + b_1 x_3 + b_2 x_2 + \ldots + b_p x_p,$$
$$Y_4 = b_0 + b_1 x_4 + b_2 x_2 + \ldots + b_p x_p.$$  

As a result of interference from human activities, flying birds, and the equipment itself, the scanner may receive a large number of erroneous reflection signals during a field investigation, and the scanner will inevitably generate a large number of outliers, or noise, when collecting point cloud data. The presence of these disturbances will have an impact on further data processing, reducing the correctness of the data, and even changing the ultimate outcome. As a result, denoising the point cloud data is important in order to increase the accuracy of the data. At the moment, the majority of commonly used denoising methods are derived from proprietary models or digital picture denoising algorithms, such as the Laplace algorithm and bilateral filtering. Throughout this work, the distance between two places serves as the primary index of measurement. It is defined by the median and standard deviation of the average distance between the points in the neighborhood calculation domain, and the maximum threshold of the distance is established by the calculation formula corresponding to that distance. The points that are bigger than the threshold are referred to as noise points, while the points that are smaller than the threshold are reserved for further calculation in the future. The formula for the relevant computation is as follows:

$$T_{\text{max}} = M_{10} + 3\sigma,$$  

where $T_{\text{max}}$ is the threshold of 10 points, $M_{10}$ is the median of 10 points, and $\sigma$ is the standard deviation of 10 points.

A large number of nonresearch objects can be found in the scanned point cloud data due to the high penetration of TLS and the use of long-distance measurement, such as shrubs under forest cover, vehicles parked on the roadside, road sign poles, and other green plants on both sides of the road, among other things. Identification and cropping of nonresearch objects, as well as retention of the point cloud data of street trees to be examined, are accomplished through visual interpretation. This algorithm uses an improved progressive encryption triangulation filter algorithm for the cropped data in order to classify the ground points; then, to eliminate the influence of terrain on the point cloud data, it normalizes the point cloud data with the separated ground points, which results in a normalized point cloud. The normalization formula for point clouds is as follows:

$$Z_H = Z_A - Z_L,$$  

where $Z_H$ is the normalized elevation of each point and $Z_A$ is the real elevation of each point, that is, the absolute elevation. $Z_L$ is the elevation of the ground point adjacent to each point.

The selected street trees are planted at equal intervals, and the canopy is less occluded from one another, which is favorable to the single-tree segmentation of vegetation and improves the accuracy of parameter extraction, as well as the accuracy of the single-tree segmentation of vegetation. Initially, the seed points are manually selected at the tops of each tree for broad-leaved roads based on the scattered characteristics of their canopy structure. The horizontal distance between adjacent seed points is used as a threshold in this case because of the scattering characteristics of the canopy structure of broad-leaved trees. Point clouds are clustered and divided based on the horizontal distance between each point cloud and two seed points; the result is that a point cloud is divided into seed points with a lower...
distance between them. Compared to TLS segmentation, this segmentation approach has a better level of accurate segmentation. Using the structure characteristics of *Juniper juniper*, the common TLS point cloud segmentation method is selected for the coniferous and broad-leaved mixed road. The root part of each tree is selected as the initial seed point, and the clustering segmentation is carried out in a clockwise direction from the bottom to the top.

To determine the relative distance between two points in a point cloud, the normalized point cloud data can be employed. As soon as the single tree has been segmented, it is possible to identify the attribution of the resulting point cloud. While single-tree segmentation is performed, there is a certain amount of error, which means that all trees cannot be totally and correctly segmented, and it is therefore required to discriminate between single-tree parameters when extracting them.

It is possible to extract the tree height automatically from correctly segmented trees based on the initial seed point provided in the single-tree segmentation, and the height under each branch can be measured using previous experience. Because the measuring stations are focused along the road, the 3D point cloud of the street tree often demonstrates the phenomenon that the interior of the road is completely covered while the outside of the road is sparse. This is because the measuring stations are concentrated along the road. The point cloud in the canopy has a missing rate of less than 20%, which has no effect on the automatic extraction of the canopy data. When dealing with incorrectly segmented street trees, it is necessary to manually extract metrics such as tree height and crown width based on the distance between the points in the point cloud. Finally, all statistical parameters are compiled for use in the subsequent calculation of the 3D green volume in three dimensions.

Each index is treated as a random variable, and the mean value and mean square error of each index are computed after dimensionless scaling. The weight of each index is then calculated using the mean square error approach, which takes into account the weight of each index. The amount of information is represented by the weight of the information. The bigger the standard deviation of the index, the greater its significance in the comprehensive review, and the greater the weight assigned to it in the final evaluation. According to the author’s research, the data is, first and foremost, dimensionless, and the calculating method it employs is

$$y_{ij} = \frac{x_{ij}}{\sum x_{ij}},$$  \hspace{1cm} (4)

where $i = 1, 2, j = 1, 2, 3$.

The formula for calculating the MSE and weight is as follows:

$$\text{MSE}(y_i) = \frac{\sqrt{\sum (y_{ij} - E(y_{ij}))^2}}{2},$$  \hspace{1cm} (5)

$$W_i = \frac{\text{MSE}(y_i)}{\sum_j \text{MSE}(y_{ij})}.$$  \hspace{1cm} (6)

The final evaluation formula is

$$S = \sum_i [y_{ij} \times \text{MSE}(y_i)].$$

The indicators used in this article are shown in Table 1.

### 4. Results and Analysis

Color the segmented point cloud in the order of the seed points, and then traverse the segmentation results to observe how they were achieved. One canopy segmentation error and one incomplete canopy segmentation are found among the 25 trees on the mixed coniferous and broad-leaved road, resulting in a segmentation accuracy rate of 96.2 percent; among the 31 trees on the broad-leaved road, one canopy segmentation error and one incomplete canopy segmentation are found, resulting in a segmentation accuracy rate of 94.3 percent; the segmentation accuracy rate of both is greater than 91.2 percent, indicating that the segmentation effect is effective. In part because of the noticeable differences in morphological characteristics between different tree species, the segmentation accuracy of the mixed coniferous and broad-leaved road is higher than the segmentation accuracy of the broad-leaved road.

Figures 2–4 depict the three-dimensional green volume statistics in three dimensions. Approximately 10.35 cubic meters of average green volume is contained inside each juniper tree, 401.26 cubic meters of average green volume is contained within each black poplar tree, and 30.12 cubic meters of average green volume is contained within each sycamore tree. When compared to other broad-leaved tree species, black poplar and sycamore have a broad canopy structure, which provides them with substantial advantages when estimating the quantity of green space needed. Because of the rapid growth of the black poplar, its crown width and height are significantly greater than those of other tree species.

A total of 5201.35 cubic meters of green volume exists in the study road based on the existing plant spacing. There are 25 trees per 50 m of coniferous and broad-leaved mixed roads, with a total green volume of approximately 5201.35 cubic meters. There are 16 trees per 50 m of broad-leaved roads, with a total green volume of approximately 5201.35 cubic meters, and 850.32 cubic meters are available. Comparing the broad-leaved road to the mixed coniferous and broad-leaved roads, the broad-leaved road contains only a single tree species and has a greater distance between plants between them. Within a 50 m long road, the number of small street trees in the plant-to-plant spacing of the mixed coniferous and broad-leaved road is greater than that of the broad-leaved road under the same road length condition. As a result, the total green amount of the mixed coniferous and broad-leaved road is greater than that of the broad-leaved road under the same road length condition.

With reference to the above-mentioned calculation results, and in accordance with the calculation process of ecological benefits of Shanghai Pujiang Country Park, the ecological indicators such as carbon sequestration, dust retention, and humidification of different roads per 50 m
length have been converted, and the results are depicted in Figure 5. Figure 5 shows that the carbon sequestration, dust retention, and humidification of a single tree are all positively connected with the amount of three-dimensional green content in the tree’s canopy. The more the amount of carbon captured, the greater the amount of dust retained, and the greater the amount of humidification, the greater the environmental benefits. As a result, the ecological benefits of a single-tree range from high to poor, with the highest being black poplar, followed by sycamore and juniper. When looking at the road from the perspective of the trees, the carbon sequestration, dust retention, and humidification of the coniferous and broad-leaved mixed road are all within 50 meters of each other. When compared to a broad-leaved road, the mixed road has a clear advantage in terms of environmental benefits.

As determined by the evaluation index system used in the constructed forest park landscape resource quality evaluation, the total score for the forest park landscape resource quality evaluation in this area is 82.36 points, which is in accordance with the “first-class” standard established by the evaluation index system. This national forest park is characterized by its stable forest ecosystem, stunning natural beauty; great regional ecological environment; high-quality
It also provides favorable fundamental circumstances for tourism development. It should be based on enhancing ecological environment protection. It should also be based on carrying out forest ecotourism in a scientific, reasonable, and acceptable manner in accordance with the principle of sustainable development, among other things.

5. Conclusion

Road ecological landscape construction is an important part of creating an ecological garden city and an important link in urban landscape planning. In this article, according to the data of national forest park in a region, the evaluation index of first-class forest national forest park is used as the judgment standard. Using the analytical hierarchy method, the evaluation system of forest park landscape resources quality is constructed. In addition, the evaluation system proposed in this article can objectively reflect the value of the park’s ecological whirlpool and the basic conditions for carrying out ecotourism activities based on the key index factors affecting the quality of landscape resources, which can provide a scientific and reliable reference for the development of forest parks with high-quality landscape resources in China.

Although this thesis has achieved certain research results and has some significance to the evaluation of the quality of classroom teaching in colleges and universities, there are still some shortcomings that need further improvement and refinement. The number of sample plots of young forest in this study is small, and the research results show that the intensity of the edge effect of the young forest is larger, which is different from the actual research. The results of this study showed that the edge effect of the young forest was stronger, which was different from the actual research. However, there are few young forests in the study area, and the artificial disturbance is relatively large, which affects the analysis of the edge effect pattern of young forests.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that he has no conflicts of interest.

References


