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LETTER TO THE EDITOR

Design of Green Garden Structure State Detection System Based on Landscape Pattern

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The Greenway Network is a landscape ecology and urban planning in recent years. It intersects with many disciplines. It is an in-depth and innovative approach to the current green space system planning. It captures the construction and improvement of the urban green space system and urban and rural areas while rapidly expanding the city. The green space system is integrated, and the regional greenway network is established at the same time. It is wary of the destruction of resources and the fragmentation of the landscape by rapid urbanization. It not only enriches the connotation of the traditional green space system planning, but also improves the green space system planning with its own advantages. More features. This paper firstly gives a comprehensive description of the landscape pattern, green space system and greenway concept. It reviews the development process of the greenway network, compares the current situation of foreign and domestic greenway networks, and summarizes the research methods of greenway network planning. The technology focuses on the important role of landscape ecology and landscape pattern analysis in constructing a greenway network. This paper provides a comprehensive understanding of the greenway network, including details of its constituent factors, functional types, and impact factors. The introduction of the landscape, the landscape pattern analysis and the landscape structure index are highlighted, and the feasibility of applying the greenway network to the urban green space system planning is explained, so that people have a deeper understanding of it.

Ecological garden; green space structure; detection; state

I INTRODUCTION

The acceleration of urbanization has caused urban construction land to erode ecological land, and the ecological problems such as urban heat island effect, landscape green land fragmentation, biodiversity loss and habitat destruction are common in urban human settlements.The construction of an ecological garden city is a positive exploration to solve the current difficulties faced by the city and an inevitable choice to ensure the sustainable development of the city. The urban ecological garden green space system planning is an important support and guarantee for the construction of ecological garden city, and its core content is the green space spatial structure planning.

In addition, the landscape ecological security pattern is of great significance for maintaining the integrity of urban ecosystem structure and process, protecting biodiversity, and achieving continuous improvement of ecological problems. It constructs the core content of landscape ecological security pattern and is the spatial planning decision-making method.

At present, the domestic spatial planning strategy method is used to construct the landscape ecological

security pattern. It includes the construction of the ecological security pattern of the scenic area, the extraction of the urban green heart, the combination of the granularity inverse method, the ecological resistance surface comprehensive construction method, etc.However, the landscape ecological security pattern constructed by the spatial planning strategy method has not been perfected in the application of urban green space system.Therefore, the integration of the landscape ecological security pattern constructed by GIS means into the green space spatial structure planning is a good point for the study of the ecological garden green space system, and also provides a new idea for the future construction of the ecological garden green space system.

Minghua Wei, Zhihong Zheng, Xiaohan Duan and others published an article in the journal Ekoloji's 2019 Issue 107. Its topic is "The Application Research of Sunken Green Space on the Sponge City Designation (An Ecological Perspective)", this paper proposes the concept of a sponge city in response to the water crisis brought about by the rapid development of urbanization in China.In the study of runoff control ability of sinking green space with different parameters, the first reservoir reservoir project in Yizhuang was selected as the research area, and the stormwater quantity management model (SWMM) was established for simulation calculation.The results show that in the recovery period of less than 10 years, the depression with a depth of 150mm and an area ratio of 1/2 can effectively reduce rainfall runoff, and the recovery period can reach 11.85%-24.59%. When the depth is 200mm and the area ratio is 1/2, the sinking green space can effectively reduce the peak runoff from 41.9% to 48.68% in the recovery period of less than 20 years.That is to say, the optimal area ratio of the green space is 1/2, and the depth between 150mm and 200mm can be selected according to the flood control standard and the actual construction cost.The sinking green space should be combined with a variety of lid facilities to avoid uniformity and ultimately achieve the best results. However, the use of this method is more accurateThe literature proposed the GIS-based landscape pattern analysis and optimization design of park green space in Nanchang City. With the help of GIS technology, the park green space database was established. The FRAGSTATS landscape pattern software was used to calculate the corresponding landscape index.Based on the quantitative analysis of the existing landscape pattern of park green space in Nanchang City, the optimization strategies and schemes are proposed, and the optimized landscape pattern is evaluatedThe results show that the spatial distribution of plaques in the existing park green space is uneven, and the area difference is large, especially in densely populated areas, the number of park green patches is less, and the effective shelter area is obviously lower; by increasing the number of patches , plaque area, improve the connectivity between plaques, and appropriately increase the landscape fragmentation index, can optimize the "point-line-face" pattern of the park green space system in Nanchang, making the spatial distribution more reasonable and effectively enhancing its biodiversity. Sexual protection and disaster prevention and avoidance function; the plaque diversity index and evenness index of the optimized park green space have been greatly improved, the aggregation index is also significantly increased, and the dominance index is reduced accordingly, and the landscape diversity is more In order to enrich the above problems, this paper proposes the design of an ecological garden environment green space structure state detection system based on landscape pattern.

II IDEA DESCRIPTION

1. Research area overview

Located in the southeast of Beijing, Tongzhou District is the northern starting point of the Dongdaemun and Beijing-Hangzhou Grand Canal.The regional geographic coordinates are 39°36’ north latitude, 40°02’, east longitude 116°32’, −116°56’, north and south long 48km, east and west wide 36.5km, and the area is about 906km2.Tongzhou District is a continental monsoon climate zone. It is dry and windy in spring, hot and rainy in summer, high in summer and cold and dry in winter. The

annual average temperature is 11.3 ft and the annual average precipitation is 620 mm.

The research area of this paper is Tongzhou New City. It is the urban area of Tongzhou District's "Modern International New City" work plan. It is expected that the new city will take shape during the "Twelfth Five-Year Plan" period.Its planned area is 155km^2, of which the core area is 48km^2, and the future population will reach 1 million.The development speed of Tongzhou old district will advance rapidly in recent years. Therefore, how to rationally carry out urban green space system planning in Tongzhou New District is an urgent issue.This paper starts from the GIS spatial analysis and the rational data of ecology, and constructs the urban green space structure of the study area, which provides reference for the planning of the ecological garden green space system in the study area, which has profound practical significance.

2. Research method

In this paper, quantitative analysis is used to derive qualitative research, and then return to the quantitative analysis method to obtain the relatively scientific and rational spatial structure of the ecological garden green space system in Tongzhou New District.The ecological process and function of the city cannot construct a model for intuitive analysis and evaluation, and the urban landscape ecological security pattern reflects and presents the urban ecological process and ecological function to a certain extent.Therefore, the landscape ecological security pattern constructed by GIS is used as the technical support for studying the spatial structure of the ecological garden green space system in Tongzhou New District, and the spatial structure of the constructed spatial structure is evaluated to verify whether the constructed urban space green space conforms to the ecological garden. The requirements of the green space system, research ideas (Figure 1).

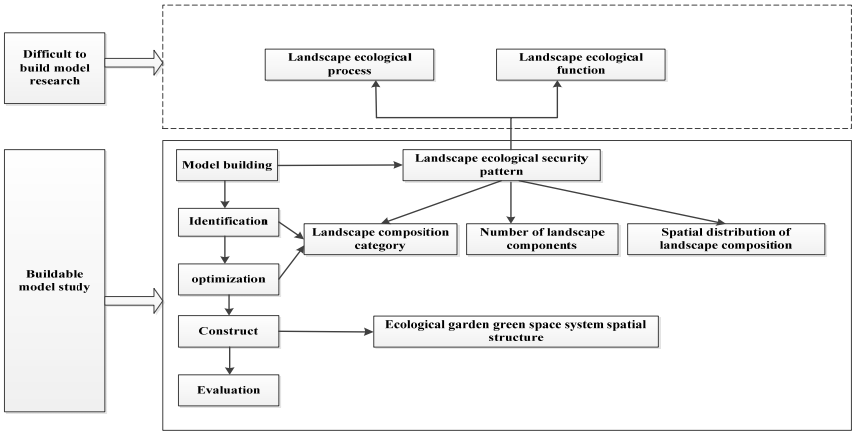

Figure 1 Research ideas

Since the development of Geographic Information System (GIS) provides a strong technical support for the research of green space system, the GIS method is used to construct the landscape ecological security pattern of the study area.According to the basic model of ecological network, the type, number and spatial distribution of regional landscape composition are analyzed, and the landscape types of the study area are identified as ecological source, ecological node and ecological corridor.

In this paper, the cumulative consumption distance model and the resistance surface model are used to identify corridors and plaques, and to construct a landscape ecological security pattern.On the basis of the construction of the landscape ecological security pattern of the study area, the landscape ecological security pattern of the study area is optimized with reference to the relevant data of the ecological garden city planning quota index, and the green space structure of the study area macro level is obtained.Finally, using the landscape pattern index related to the GIS platform, the spatial pattern before and after the optimization of the study area is evaluated.

3. Data source

The data source selected in this paper is the QuickBird remote sensing image on February 3, 2016. The relevant data also includes the 2012-2020 Tongzhou Greenland System Planning Atlas and Tongzhou Zhi (2004).

4. Landscape type division

This paper uses the remote sensing image supervised classification method and the visual interpretation method in the ArcGis 10. 2 environment to interpret the landscape type of the study area.According to the research needs, it is divided into urban construction areas, river waters, roads, industrial areas, and green areas.The urban green space in the study area is divided into auxiliary green space, park green space, protective green space and production green space by means of green space system planning.Finally, the random sampling of the field type for field accuracy shows that the correct rate is 91.5 %, which is in line with the general specification of remote sensing interpretation.

5. Constructing the landscape ecological security pattern of the study area

The essence of the construction of the urban landscape security pattern is to re-connect these ecological land that was forced to be divided by urban construction through a linear urban ecological corridor.In order to ensure the network of the basic forms of urban ecosystems and the smooth operation of ecological flows, at least one ecological corridor should be linked between adjacent ecological sources.As far as the research area is concerned, the identifiable ecological source land, that is, the land with ecological functions mainly includes water, forest land and urban green space.The identification of ecological corridors uses the cumulative cost distance model. Firstly, the various types of land in Tongzhou New District are used to assign the functional value of the ecosystem, and the resistance surface model is constructed. The minimum resistance channel between the two sources is obtained, and the ecological corridors are met. It is an ecological node, which forms a basic urban landscape ecological security pattern composed of ecological sources, ecological corridors and ecological nodes.

6. Identification of ecological factors

From the theory of “source-sink” of landscape ecology, “source” is the type of landscape that plays a role in maintaining and promoting landscape function, while “sink” is the opposite, mainly referring to the type of landscape that inhibits the development of ecological processes.On the basis of this theory, the waters and green areas of the study area are identified as ecological sources.The identification of the ecological corridor depends on the determination of the ecological flow. The ecological flow exists between the “source ecological patch” and the “target ecological patch”, which is the carrier of the ecological process and the decisive factor for the stability of ecological function.Therefore, this study identified green areas with an area of more than 5 km 2 as “source patches” and identified green areas with an area of 2 km 2 or more and 5km 2 or less as “target patches”.Due to the operation of this ecological flow, it is necessary to overcome the resistance of different landscape elements.Based on a large number of literature achievements and expert judgments, this paper comprehensively considers the landscape type, quantity and spatial distribution of the study area. From the perspective of ecological garden city green space system planning, the classification of urban landscape land is correspondingly assigned to build accumulation. Cost distance model.

III RESULTS

According to the assignment result of the landscape type of the study area, the cumulative cost distance model constructed by GIS tools is used to calculate the cost direction and cost distance of the study area.The corridors identified herein include explicit corridors and recessive corridorsExplicit corridors are easily identifiable corridors visible in the study area, but the number is small, mainly including the North Canal Ecological Corridor, etc., which can be intuitively retained in the ecological garden green space planning

system.The hidden corridor is not easy to observe directly, but it plays a vital role in the flow of urban ecological flow. Therefore, in the construction of ecological network, it is necessary to consider the identification of hidden corridor.Since the research area is located in the core area of urban construction, the identification of the two types of ecological corridors must be combined with the existing artificial ecological corridors in the study area to obtain a relatively complete ecological network structure.

Through the above quantitative identification and optimization of the landscape ecological security pattern of the study area, the characteristics of the landscape elements in the study area are obtained, and then qualitative analysis can be used to obtain the landscape ecological security pattern planning of the study area.The landscape pattern planning of the study area includes an ecological source area, which is mainly composed of green areas along the two sides of the canal. It also includes four first-class ecological corridors, several secondary ecological corridors and ecological nodes.For the existing landscape ecological security pattern and the planned spatial structure in the study area, GIS tools were used to select 7 landscape indices with clear ecological value, including plaque density (PD), average plaque area (MPS), and landscape shape. The index (LS/), the maximum plaque index (LP /), the average plaque area (4 feet £A_MiV), the marginal area ratio (PMA_MV), and the average shape index (•m4P £_MiV) were evaluated to reflect the The difference between the complexity of ecological structure and ecological benefits.

In order to further verify the performance of the proposed algorithm, under the condition of constant data increment, the runoff control ability of the sinking green space with different parameters of the proposed algorithm and the traditional algorithm is studied. The test results show that the results show that in the recovery period of less than 10 years, the depression with a depth of 150mm and an area ratio of 1/2 can effectively reduce rainfall runoff, and the recovery period can reach 11.85%-24.59%. When the depth is 200mm and the area ratio is 1/2, the sinking green space can effectively reduce the peak runoff from 41.9% to 48.68% in the recovery period of less than 20 years. That is to say, the optimal area ratio of the green space is 1/2, and the depth between 150mm and 200 mm can be selected according to the flood control standard and the actual construction cost. The sinking green space should be combined with various cover facilities to avoid uniformity and finally achieve the best results. The stability of the algorithm is better and the extraction efficiency is higher.

IV DISCUSSION

The problem of ecological garden environment green space has been widely concerned. In today's information age, it is necessary to use Internet technology to analyze the ecological environment.In the cloud computing environment, this paper studies the incremental data extraction of green space in ecological garden environment, and verifies the superior performance of the proposed algorithm through experiments.

Experimental results show:

The accuracy of data extraction in this algorithm is higher than that of traditional algorithms. This is because the calculation steps of the traditional algorithm are complicated, and the steps of normalizing the greenfield information data, clustering the information data, exponential analysis, and normalizing the pollution index weights are required to complete the data extraction, and thus the amount of data to be used is large. The data extraction accuracy rate reached a high level, and the value is far lower than the algorithm in this paper.

Compared with the traditional algorithm, the data extraction stability of the algorithm is higher. This is because in the process of detecting and extracting the green space structure state, the operation in the ecological garden environment green space structure state monitoring source database is carried out by means of the comparison method. The classification and aggregation, in turn, the incremental extraction of data, improve the efficiency of the extraction of the algorithm.

V CONCLUSION

Based on the preliminary statistics of the existing data, it can be seen that the existing green space rate in the study area is 25.26%, and the green coverage rate is 36.25%, which does not meet the requirements of the garden ecological city.After the above analysis, the green space rate of the study area is 33.2%, the green area is increased by 10.31km2, and the green coverage rate of the built-up area is 44.95%, which meets the requirements of the ecological garden city index and at the same time meets the urban ecological function. The desire for sustainable development.

In this paper, the GIS method is used to combine the construction of urban landscape ecological security pattern with the requirements of ecological garden urban green space system planning in landscape ecology, so as to construct the research area ecological garden green space system space. In the process of structure, there are quantitative and qualitative double data support, which has certain practical significance.

The ecological garden green space system planning emphasizes the ecological nature of urban green space, but many planning schemes are often out of touch with ecological research, and even appear to deviate from each other.Therefore, based on GIS technology, this paper puts the ecology first, and uses the method of landscape ecological security pattern planning to first carry out ecological planning for the study area, and calculates an ecological corridor loop and two first-level ecology in the study area. Nodes, 4 first-class ecological corridors, multiple secondary ecological corridors, and multiple secondary ecological nodes.Combined with the existing urban green space planning, the spatial structure of the urban green space in the study area is derived: “one ring, two cores, four belts, multiple corridors, multi-point structure”.The relevant landscape index was used to evaluate the plaque density, plaque structure and plaque morphology before and after planning to verify the rationality of the spatial structure after planning.Therefore, the research ideas in this paper are quantitative analysis to guide qualitative research, and finally return to the process of quantitative analysis. Based on the above methods and conclusions, the construction of the ecological garden green space system can be more effectively guided.

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