

Examination on the Characteristics of Chongqing Ecological Environment Based on GIS

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Abstract: With the acceleration of urbanization and urban planning, urban ecological planning is the key to guiding the environmentally friendly city development of environmentally friendly and sustainable environment. GIS analysis makes traditional data calculation more convenient and intuitive through comprehensive analysis of massive data. Applied to ecological analysis, GIS can simulate ecological conditions and simulate ecological development more effectively. Based on the in-depth analysis of GIS theory and its application in related professional fields, this paper focuses on the environmental characteristics of Chongqing and the working habits of environmental management. The objectives, structure, functions and development methods of the system are determined. Taking Chongqing as an example, this paper studies the characteristics of the ecological environment conditions affecting Chongqing's mountainous cities, and predicts and evaluates them from many aspects. The aim is to provide a favorable reference for eco-city planning and thermal environment management in Chongqing mountain cities. Then take the Jialing River Basin in the main city of Chongqing as the study area, and combine the actual ecological environment characteristics of the Jialing River Basin. Construct a watershed eco-environmental sensitivity evaluation index system, select and improve a suitable single-factor, multi-factor comprehensive evaluation model.

1. Introduction

As China's economy continues to grow steadily, the size of the city continues to expand, the urbanization process continues to accelerate, and the urban population expands rapidly. This makes the urban heat island effect increasingly prominent, and the trend of urban ecological environment is not optimistic [1, 2]. Especially in the mountainous cities of Chongqing in the west, under the craze of the development of the western region, the scale of the city has developed rapidly, which

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has brought about the deterioration of the ecological environment of the mountain city in Chongqing. At the same time, as citizens' living standards improve, so does the requirements for ecological comfort and air quality. Therefore, it is of practical significance to carry out research on the ecological environment of Chongqing Mountain City.

GIS is a computer system that uses input, storage, query, analysis, and display of geographic data. It has an intuitive graphical interface, powerful spatial data management and analysis capabilities [3-6]. GIS makes it easy to query, store, manage and display a variety of environmental information and to effectively predict, analyze and evaluate the environment. Provide comprehensive, timely, accurate and objective information services and technical support to protect the environment and achieve sustainable development [7]. GIS has the following four characteristics: First, the support of computer systems is an important feature of GIS [8]. The emergence of GIS is represented by computer software and hardware systems, and its connotation is a geospatial information model organized by computer programs and geographic data. Second, the operational object of GIS is geographic entity data [9]. The geographic entity data includes spatial feature data and attribute feature data. The most basic feature is that each data is encoded in uniform geographic coordinates. Describe its positioning, qualitative, quantitative and topological relationships. GIS uses geographic entity data as the primary object of processing and operations, which is a basic mark that distinguishes it from other types of information systems. Third, it has the ability to collect, manage, analyze and output a variety of geographic information, and supports the dynamic management of spatial geographic data [10]. Geospatial analysis can generate important information that is difficult to obtain with traditional methods, and achieve dynamic simulation and decision support for geographic processes. Fourth, GIS is closely related to geography and mapping [11]. Geography provides the basic ideas and methods for spatial analysis of GIS, and is the basic theory of GIS. Surveying provides GIS with positioning data of various scales and precisions, and its theory and algorithm can be directly used for spatial data exchange and processing. The introduction of GIS into Earth Science provides new ideas and methods for solving complex planning, management and geography-related problems [12-15].

Using GIS to assess the thermal environment Qing, F.T. &, Peng, Y. attempted to adopt an integrated development model to establish a comprehensive urban GIS system [16], using modern information science technology to evaluate, regulate, predict, plan and manage the thermal environment of Chongqing Mountain City.in mountainous cities is a natural move. This study is of great significance to the modern management and evaluation of environmental quality in Chongqing Mountain City, especially for the ecological environment protection of Chongqing Mountain City in the Three Gorges of the Yangtze River. Promoting sustainable urban development has a positive effect. It is echoing with the current "digital earth". Millar, MA and other GIS application techniques and analytic hierarchy process [17], from the natural environment of the mountain city, environmental pollution and socio-economic ecological environment for quantitative comprehensive evaluation and spatial pattern analysis, according to the assessment results, the mountain city ecological environment is divided into Five levels. The research shows that the comprehensive ecological environment of mountainous cities is gradually degraded from east to west, but the local areas are different, and the spatial distribution of the natural environment is basically consistent with the social and economic conditions [18]. Studies have shown that natural environmental conditions play an important role in the spatial differentiation of mountainous urban ecological environment, but disasters, economic development and environmental pollution also affect the spatial pattern of the ecological environment to a certain extent. Shi, Z. and other research based on GIS ecological environment information system has broken through the development model of traditional ecological environment management system [20], from traditional information systems for managing statistical data to ecological information system management based on spatial data, through spatial data and The combination of attribute data, based on the combination of spatial data and attribute data, carries out ecological environment management and decision-making, and further spatial analysis is to mine the information hidden behind the data [21, 22]. At the same time, through the GIS visualization function, the results of information and spatial analysis are displayed in various intuitive graphics, charts and multimedia, and the ecological environment information is further shared through the network.

The ecological environment is not an independent entity but a balanced system. All living organisms, including humans, and their cells and molecules are a "weight" in this system, which determines the development trend of the ecological environment [23, 24]. The weight of the "weight" has a certain relationship with the importance of its function in the system. In this paper, the GIS technology mountain city Chongqing ecological environment prediction evaluation model is established to predict and evaluate the system, which provides an effective tool for the evaluation and management of ecological environment prediction in Chongqing. Based on the analysis of existing environmental and ecological assessment model methods, an optimized regional ecological environment assessment model was established. It is used for comprehensive evaluation and mapping of regional ecological environments. At the same time, it provides a reference for the study of mountain ecological environment, and provides a framework for the implementation of environmental management integrated information system in the future, which has important reference value for urban planning.

2. Proposed Method

2.1. Geographic Information System

Geographic Information System (GIS), referred to as GIS, is an emerging interdisciplinary subject that integrates geography, surveying, cartography, electronic engineering, and computer science into a variety of applications. GIS has multiple definitions depending on the application. More typical is the definition and conceptual framework of the GIS for the United States Federal Digital Map Coordination Committee (FICCDC) (see Figure 1). The definition states that "GIS is a system of computer hardware, software, and different methods designed to support the collection, management, processing, analysis, modeling, and display of spatial data to solve complex planning and management problems."

As a special emerging information technology, GIS has been widely used in thematic map production, urban and rural planning, resource management and protection. Because geography contains a large amount of inductive material, such as text representations, schematics, etc., students are required to convert simple text representations into specific images for analysis. Or convert a geographic map to text for presentation. This will provide data and information support for eco-environment researchers and decision makers in different regions. To address the purpose of ecosystem services issues, plans and strategies can be refined and sublimated, processed and regenerated through ecological information. The development of modern ecosystem services research requires the support needed to provide strong technical support for the study of ecosystem services. Computer software systems, spatial data or geographic data and personnel systems management, operations, users and institutions. The system structure is shown in Figure 2.



Figure 1. Conceptual framework



Figure 2. GIS system composition

1) Computer hardware system

A computer hardware system is a general term for a physical system of a computer system operated by a GIS. It consists of four parts: output devices, storage devices, and processing devices for storing, processing, transmitting, and displaying geographic or spatial data. The specific hardware configuration varies depending on the GIS working mode. Special input devices such as GPS and total stations, as well as traditional input device plotters such as digitizers and scanners. Processing devices such as CDs, hard disk storage devices, workstations, etc.

2) Computer software system

The computer software system refers to various softwares required for the operation of the GIS system, and is composed of system software, basic software and GIS software, and is used for

performing various operations of the GIS function. This includes data collection, storage, processing, database management, spatial analysis, modeling, output, and spatial data display. System software includes programming languages, math libraries and other system libraries and system calls, device operations and other operating system basic software mainly refers to graphics, databases and other standard software. GIS software includes GIS basic function software, GIS application software and user interface.

3) Spatial data

Spatial data, or geographic data, is the operational object of GIS and management content. Refer to the spatial location of the Earth's surface to describe data from natural, social, and human landscapes, and detail the spatial, attribute, and temporal characteristics of geographic entities. Spatial data can be abstracted by points, lines, and polygons. It can be graphics, images, text, tables, numbers, etc. It can be imported into GIS via a digitizer, scanner, keyboard, tape drive or other communication interface. Spatial data must be stored and organized according to a specific data structure to establish its standard data files or geodatabases. Therefore, GIS can integrate spatial data from different sources to provide a comprehensive analysis of spatial issues.

4) GIS personnel

GIS personnel are a dynamic geographic model. It is a complex man-machine system, from the design, establishment, operation to maintenance of the entire life cycle, everywhere cannot be separated from the role of people. And need special personnel to carry out system organization, management, maintenance and data update, system expansion, application development and so on. And use geography analysis models to extract various information for research and decision-making services.

2.2. Evaluation model suitable for the characteristics of mountain city Chongqing

Due to the complexity, ambiguity and irreversibility of Chongqing's urban land use system, it is difficult to determine the factor weight of Chongqing construction land suitability evaluation through accurate and objective mathematical models. If the on-site land use situation is not sufficient and the weighted mathematical model is too convincing, the weight distribution is unreasonable and the indicator cannot reflect its value. It is difficult to correctly reflect the situation on the ground. In this paper, the normalized eigenvectors and eigenvalues solved using the square root method are taken as examples until the consistency test is satisfied. The product M of each row element of the judgment matrix is calculated, and the formula is (1).

$$M_{i} = \prod_{j=1}^{n} a_{ij} \qquad (i, j = 1, 2K \ n)$$
(1)

Calculate the power square root of each row M:

$$\overline{W_i} = \sqrt[n]{M_i} \tag{2}$$

Normalize the vector, formula (3):

$$W_i = \overline{W}_i / \sum_{j=1}^n \overline{W}_j \tag{3}$$

Calculate the maximum characteristics of the judgment matrix (4):

$$\lambda_{\max} = \sum_{i=1}^{n} \frac{(AW)_i}{nW_i} \tag{4}$$

The final consistency test is the formula (5):

$$CR=CI/RI$$
 (5)

Where CR is the random consistency ratio of the judgment matrix. RI is the average random consistency indicator of the judgment matrix. CI is the consistency indicator of the judgment matrix.

 λ_{max} is the largest eigenvalue and m is the order of the judgment matrix. When CR<0.1, the judgment matrix is considered to have satisfactory consistency. Otherwise, the value of the judgment matrix element needs to be adjusted to make it have satisfactory consistency. The construction suitability evaluation method adopts an evaluation model combining qualitative analysis and quantitative calculation. Based on the multi-factor evaluation model (6).

$$P_{j} = \sum_{i=1}^{n} F_{j,i}(g, w)$$
(6)

In the formula (6), P is a total score. j is the jth evaluation unit. i is the i-th indicator. n is the total indicator. g is the indicator score value of the indicator weight. Consider a variety of factors that affect the appropriateness of urban construction land. This evaluation method is suitable for the evaluation of the land use of the mountain city in Chongqing where the land quality is more distinct. The special factor influence coefficient is introduced, and the comprehensive index comprehensive factor, the basic index comprehensive coefficient and the basic factor comprehensive evaluation score value are calculated, and the land suitability level is divided according to the comprehensive score. The calculation formula is as shown in (7).

$$P = K \sum_{i=1}^{m} w_i \bullet X_i \tag{7}$$

Using GIS technology to assess the applicability of construction land can not only combine relevant spatial data with attribute data. You can also flexibly query, analyze, process and even simulate these data according to your needs, thus significantly improving the accuracy of land suitability assessment. Reduce the workload of personnel analysis and mapping and improve the efficiency of evaluation.

2.3. Characteristics of Chongqing Land Use in Mountain City

(1) Complex natural environment

Urban land is a complex system that combines various factors. The system specifically includes topography, engineering geology, climate meteorology, soil, hydrology, natural disasters, ecological environment, economic environment, technical environment, policies and regulations, planning management and population. Natural environmental factors play a key role in the suitability of urban land use. The main features distinguishing the mountain city from the plain city are the complex geomorphology, which is caused by factors such as altitude, slope, slope direction and microclimate. Chongqing Mountain City is generally composed of mountains and river valleys. The slope ratio is two, the ditch system is strong, the valley is widely distributed, the surface is cut strongly, and the terrain is broken. The complex geomorphic environment of Chongqing Mountain

City has become the most direct and important factor affecting the suitability of construction land. For example, land use of urban land is suitable as a construction site. In general, a slope of 55% or more is classified as prohibited building land. At the same time, the mountain city of Chongqing is often divided by mountains, rivers, gullies, and valleys, and the height difference is large and undulating. Construction land cannot be concentrated like the land used in plain cities, but it is mostly scattered, which makes it difficult for urban land expansion and infrastructure.

(2) Fragile ecological environment

The natural elements such as landform, geology, climatic meteorology and hydrology constitute the basis of the urban land ecological environment, and also the basic ecological elements of urban land development and utilization. These natural ecological elements naturally exist along with the natural production of land, and various ecological relationships formed between various elements in the long-term process of land evolution also exist naturally. It does not disappear because of human activities. Due to the complexity of geomorphology and geological conditions, Chongqing's ecological environment is more fragile and sensitive than ordinary cities. The economic and technological activities of human beings on land are likely to cause shocks and destruction of the foundation. Such as mountain vegetation, ground cover materials and other site conditions are poor stability, easy to destroy, difficult to recover. The fragility and sensitivity of the mountainous ecological environment in Chongqing is reflected in the weak resistance of the mountainous ecological environment to the outside world. Under the guidance of external factors, it is easy to deviate from ecological interpretation or even collapse. Because of human existence, it is not a system of "self-sufficiency". The larger the city, the larger the population, the greater the interference with the natural ecological environment, and the more sensitive and complex the ecological and environmental problems it brings. The greater the interference and influence on the natural regulation of the natural ecological environment of Chongqing mountainous areas.

(3) Tension between people and land

Human beings are the main elements of urban land use. There is a certain relationship between population and construction land, that is, human-land relationship, which is interdependent and mutually restrictive. The contradiction between people and land in Chongqing is mainly reflected in the population size and the quantity and utilization of urban land use and the relationship between human activities and urban land use. The size of the urban population determines the scale of urban land use. In a certain number of explanations, an increase in population will stimulate the development potential of urban land use and stimulate land development. As a result, the construction intensity of urban land will be greatly enhanced, and the economic benefits of land will also increase. The rich material culture brought about by the improvement of land economic benefits will in turn stimulate population growth. Once the population size exceeds the land carrying capacity, the relationship between man and land will deteriorate and be reflected in various forms such as society, economy and ecology.

2.4. Ecological Sensitivity Analysis Method

(1) Direct superposition method

The direct superposition method is divided into a map superposition method and a factor summation method. The map superposition method is the earliest calculation method used in eco-sensitivity evaluation. It determines the distribution of factors and the level of suitability. The method of representing the suitability of color depth is drawn on the transparent drawing, and the single-factor suitability evaluation map is obtained. The factor map is superimposed and photographed to obtain a comprehensive evaluation map. This is an intuitive method, but the factors in the method are equal weights, which are inconsistent with the actual, and when the factors increase, the colors are more difficult to distinguish after overlapping, and the process is cumbersome and must be eliminated. Although the map superposition method is no longer used, it is the ancestor of the ecological sensitivity evaluation method. It has great historical significance for the evaluation of ecological sensitivity, and has opened up a new path for the effective utilization and rational planning of resources.

(2) Weighted superposition method

The weighted superposition method is the most widely used method in GIS technology. The biggest breakthrough is based on the superposition method, considering the importance difference of each evaluation factor, the importance of distinguishing factors according to the weight assignment, and the ability to Grid, hierarchical and quantitative, accurately represent the nuances of the overlay, and can be well integrated with GIS. The evaluation idea of the weighted superposition method is roughly as follows: Firstly, the ecological environment problems existing in the study area are analyzed to find out the main causes of the problems. The ecological sensitivity evaluation factors are selected according to the specific conditions, and the classification system and evaluation criteria of the evaluation indicators are established. Establish ecological sensitivity in GIS.

(3) Ecological factor combination method

The combination of ecological factors is the closest method to the natural ecological environment in the current evaluation methods. It can be divided into a hierarchical combination method and a non-hierarchical combination method. The hierarchical combination method is a process of forming a new factor to participate in the evaluation through continuous combination of evaluation factors. In the case of more factors. The non-hierarchical combination method combines all factors to determine the sensitivity of the ecology. The two methods must be based on a complex and complete combination of factors and judgment criteria established by a set of experts. If the combination of factors is unreasonable and the judgment criteria are unscientific, it will directly lead to inaccurate evaluation results. This is also the ecological factor combination method, and even It is a major problem facing ecological sensitivity analysis. Therefore, the current theory of ecological factor combination method is immature, and relevant standards have not been established, which is difficult to apply to ecological sensitivity evaluation.

3. Experiments

3.1.Basic Overview of the Research Location

Chongqing is located in the southwest of China and the upper reaches of the Yangtze River. The transition zone between the Qinghai-Tibet Plateau and the middle and lower reaches of the Yangtze River is located between 28 °10' and 32 °13' north latitude. It is adjacent to Hubei in the east, Hunan, Guizhou in the south, Sichuan in the west and Shaanxi in the north. The area is 470 kilometers long from east to west and 450 kilometers wide from north to south, covering an area of 82,400 square kilometers. The main city of Chongqing is 168 to 400 meters above sea level. Among them, the area below 500 meters above sea level is 31,800 square kilometers, accounting for 38.61% of the area; the altitude is 20 to 800 square kilometers, the altitude is 500 to 800 meters. Kilometers, accounting for 25.41% of the area; the altitude is 800 to 1200 meters, the area is 16,800 square meters. Kilometers, accounting for 15.56% of the region. Chongqing is a subtropical monsoon humid climate with an

average annual temperature of 16~18 °C and an average temperature of 28~34 °C. The coldest month average temperature is 4~8 °C, and the four seasons can be clearly divided by temperature method. The annual average precipitation is abundant. The climate coefficient statistics are shown in Table 1.

Serial number	Name	Average	Index	Coefficient
1	Temperatu re	16~18°C	Max 43.5°C Min 2°C	MaxHot 36.5°C /month
2	Precipitati on	1000~1350 mm	Max1680mm	Evaporation 66830mm/year
3	Wind	3.9m/s	Max 6.7m/s	Windy day 34.1 day

Table 1. Climatic coefficient statistics table

The data in this paper is multi-sourced, and the data covers three major data types: map data, remote sensing image data and text data. It mainly includes the distribution map of Chongqing, 11,000 topographic maps, and 1:50,000 geological maps. Through the processing of map data, a geospatial database of geological factors, geographical factors, hydrological factors and human factors is obtained. Finally, the comparability and synthesizable of each factor are realized, and the spatial reference coordinate system of each factor is unified. All data are referenced to the corrected 1:10000 topographic map, and the coordinates are unified to Xian80. After the GIS database is established, the unified projection is converted to Xian-1980-3-degree-GK-CM-108E.

3.2. Eco-environmental Evaluation Module Division



Figure 3. Composition module of ecological environment assessment

In the ecological environment assessment, firstly, according to the ecological environment of the study area, several influencing factors affecting the ecological environment are obtained. These influencing factors are studied separately as research objects. Soil and water loss, desertification, salinization, acid rain, and biodiversity are usually affected by ecological environment. Individual special environments have special factors. Several influencing factors for the analysis of the ecological environment are the quantitative division of sensitivity to each ecological environment problem. However, due to the lack of basic data, it is still difficult to adopt quantitative methods.

Comprehensively carry out ecologically sensitive zoning, point out the main ecological problems and characteristics of different regions, and help people to determine the governance priorities of ecological environment issues in different regions. Propose the countermeasures for regional ecological environment remediation. Based on the analysis of the regional ecological environment, regional and environmental factors affecting the ecological environment are proposed. In a comprehensive and qualitative way, a regional eco-environment sensitive zoning plan was proposed. The components of the entire eco-environment are shown in Figure 3.

4. Discussion

4.1. Ecological Environment Assessment Results

From the perspective of ecological geography, the geomorphic environment is a vibrating object formed by long-term wind erosion raindrops under natural climatic conditions. A natural biological chain with a certain regularity, in which any change or cancellation of the link will bring about a series of adjustment processes, it can be seen that respecting the characteristics of the original terrain and landform is conducive to emphasizing the characteristics of the landscape. Landscape planning and design that respects the local environment can showcase the skyline of the city's original terrain, which is an important source of outstanding features. If we protect the original geographical landscape and give full play to its value on this basis, it will help to highlight the characteristics of the natural environment and thus show the charm of the new regional landscape. As can be seen from Figure 4 (Figure 4 from www.image.baidu.com), the natural environment of Chongqing gives the charm of Chongqing Mountain City and Jiangcheng. This is a unique place for the formation of Chongqing's natural environment.



Figure 4. Chongqing Hongyadong night view

The eco-environmental evaluation is subject to the selection of evaluation factors, derived data, reclassification, weighting, and weighted superposition. The level of comprehensive evaluation index reflects the appropriateness of land use. The higher the evaluation index, the more suitable it is to construct. The level of evaluation index is used to determine the appropriate level of construction land.

4.2. Requirements for Ecological Environment Utilization in Chongqing Urban Construction

(1) The influence of mountains on urban layout

Some functional units of the town, such as airports, railway stations and certain industrial production sites, have strict requirements on the slope of the terrain and the area of the plot. However, the land suitable for construction in the jurisdiction of Chongqing is often lacking in scale. Chongqing urban planning and construction requires harmony, nature, livability and appropriateness. It meets people's requirements for life in the times; it also makes full use of natural conditions such as geology and topography. Only by fully considering these two aspects can we reduce or avoid a series of difficulties caused by topography and geological conditions. If you do not pay attention to the use of topography and geological conditions, it will not only lead to an increase in construction costs and earthwork. It also often leads to unreasonable urban functions and environmental damage and disasters that directly affect people's use and safety. It is not conducive to the life and production of the residents, but also will bring difficulties to the future development. (2) The influence of the characteristics of urban construction in Chongqing

The mountain environment determines the architectural form of the Chongqing city. The layout and design of the mountain building is determined according to the surface treatment method, usually determined by factors such as the slope of the terrain, the direction and contour of the building axis, and the construction method. Morphological characteristics: reduce grounding; indefinite base; mountain house harmony (coordinate with location environment, harmonious with the whole mountain). The layout and design of urban buildings in Chongqing are determined according to the surface treatment methods, usually based on terrain slope, building axis direction and contour lines, and construction methods. Land disposal methods mainly include platform method and platformless method. Figure 5 shows the relationship between the mountain location of Chongqing Mountain City and urban construction.



Figure 5. The relationship between the mountain position and the urban construction of the mountain city of Chongqing

(3) Traffic treatment methods in mountainous and hilly areas

The function of the street, the longitudinal cross-section design of the street should be in line with public facilities such as transportation, drainage, greening, environmental protection, underground pipelines. In addition to coordinating the architectural layout along the street, special attention should be paid to the coordination of mountainous terrain. The maximum longitudinal slope of mountain roads should not exceed 8%. Considering the characteristics of the logistics parks, it is concluded that the internal road longitudinal slope should not exceed 5%. When the cross-section layout is limited by the terrain, engineering measures such as picking, setting, racking and wearing can be appropriately adopted to make the street smooth and perfect, and it is convenient to form a street and organize traffic. The road wiring combined with the topography is shown in Figure 6.



Figure 6. Road wiring combined with terrain

4.3. Comprehensive evaluation results of Chongqing water regional characteristics

Chongqing comprehensively evaluated the ecological and environmental impacts of the study area as shown in Figure 7.



Figure 7. Distribution of ecological and environmental impacts in Chongqing

From Figure 7, we can analyze the distribution of ecological environmental impacts. There are very few influential areas in the study area of Chongqing, scattered in the highly sensitive areas of the northern dark areas, mainly in the Jialing River and the north. A small number of sporadic distributions are widely distributed in the Shapingba District and the moderately sensitive areas of the Yubei District. Through statistics, the main areas are ecologically insensitive, moderately sensitive, highly sensitive and extremely sensitive, accounting for 12.23% of the total area of the study area, respectively. 28.94%, 43.14%, 15.39%, 0.0041%. It can be seen that

the ecological environment impact of the main urban areas of the Jialing River Basin in Chongqing is moderately sensitive, followed by sensitivity and sensitivity. Minimize the area of these two areas and convert to a low sensitivity level; the moderately sensitive area is the most malleable area, and it has the greatest possibility of developing to two levels, so it should protect its original ecosystem and avoid Deliberate destruction, to prevent the transformation of malignant areas into highly sensitive areas; for light and insensitive areas, it can be used as a land reserve resource for urban development, and can be developed and constructed as a place for human activities.

5. Conclusion

Ecological environmental protection is a career that is conducive to the future and benefits. In the Internet age, the rapid development of information technology has enabled us to have more scientific and precise scientific and technological means. The technology led by GIS is a great help for urban planning and ecological planning. This paper mainly focuses on the characteristics of Chongqing land use in mountainous cities and Chongqing, based on urban planning, analyzes the characteristics of mountain land use in Chongqing and the requirements for the evaluation of land use suitability, and studies the index system and evaluation method. An index system and model suitable for the suitability evaluation of construction land in Chongqing are established. The suitability evaluation of construction land is carried out with technical support, and a reasonable evaluation result is obtained. The research results also have certain reference and guiding significance for the evaluation of the suitability of Chongqing's planned land construction in other similar mountain cities. This study mainly draws the following conclusions.

(1) This study uses the GIS spatial analysis method to give full play to its scientific calculation and analysis functions, and studies its application in Chongqing's ecological environment planning. Different geographical environments have formed different regional cultures. The organic integration of the times and global culture will inevitably affect the innovation of regional ideas. The discussion of urban dialect landscape is a new exploration of regional landscape in the current era. People hope that the innovation of ideas will be put into practice, thus guiding the creation of regional characteristic landscapes in Chongqing.

(2) Through statistics, the area of ecologically insensitive, mildly sensitive, moderately sensitive, highly sensitive and extremely sensitive areas in the main area accounted for 12.23%, 28.94%, 43.14%, 15.39%, 0.0041% of the total area of the study area, respectively. It can be seen that the ecological environment impact of the main urban section of the Jialing River Basin in Chongqing is moderately sensitive, followed by mild and severe sensitivity.

(3) This paper unifies the format and coordinates of multi-source data. The comprehensive utilization of different types of data has been realized to carry out comprehensive sensitivity evaluation of the study area. Based on 1:10000 large scale topographic map data. Minimize the area of these two areas to convert to a low sensitivity level; the moderately sensitive area is the most malleable area, and it is the most likely to develop to two levels, so it should protect its original ecosystem. To avoid man-made damage and prevent the vicious conversion of the area into a highly sensitive area; for the mild and insensitive areas, it can be used as a land reserve resource for urban development, and can be developed and constructed as a place for human activities.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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