Analysis of Ecological Construction and Protection Measures of Urban Water Environment Based on Uncertain Information

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Abstract: With the rapid development of urban and rural construction, it is widely used in the construction of ecological city, whether it is the protection of water resources and water environment or its corresponding treatment. On the one hand, cities are increasingly dependent and demanding on water safety, water resources and water environment; On the other hand, in the process of urban construction, due to the continuous occupation and emission of pollutants, the ecological and environmental problems of urban water system are very prominent. Based on the uncertain information theory, this paper puts forward the basic principles that should be followed in the ecological construction of urban water environment, discusses the countermeasures and technical measures for the ecological water conservancy construction of urban water system, and analyzes the problems existing in the current ecological construction of urban water environment, aiming at providing relevant technical support for the construction of water ecological civilization in China and providing scientific and technological services.

1. Introduction

The classical definition of ecology is "the relationship between living things (including people) and the environment". According to this, it can be considered that any residential area is ecological, but the ecology of some cities is more reasonable, and the relationship between man and nature and environment is more harmonious; While others are unreasonable and harmonious, and even deteriorate [1-2]. In recent years, due to domestic sewage, industrial wastewater, urban non-point source pollution, livestock and poultry/aquaculture outside urban areas, farmland non-point source pollution and other pollution, the water quality of urban water system has been deteriorating. At the same time, due to the eutrophication of rivers and lakes and excessive exploitation and utilization, local waters began to show black odor phenomenon, and the original ecosystem was gradually destroyed.

The shortage of water resources, coupled with the rapid increase of water consumption and sewage discharge, has made the present situation of urban water environment even more worrying. In the past 20 years, due to the sustained and rapid economic development, the water crisis characterized by a sharp increase in water consumption and sewage discharge, water shortage and serious water pollution has become the most prominent constraint factor in China's social and economic development [3].

The research on uncertain information has become a hot spot in scientific research, and almost all scientific research involves the processing of uncertain information. Based on uncertain information, this paper focuses on the relationship between urban construction and ecological environment, hoping to promote the harmonious coexistence between urban environment and landscape.

2. The origin of uncertain information

Information is the fundamental basis for human beings to know things. Information can be divided into source information and sink information. Source information is the reflection of the

essential characteristics of things, and it has certainty, which has objectivity independent of people [4]. The source information is emitted outward under the action of energy, and is transmitted to the receiving system through channels (including understanding standard measuring tools and transmission process, etc.). The information that human beings can obtain can only be the information presented by the receiving system, that is, the result of the interaction between subject and object. It has subjectivity caused by the subject, objectiveness reflecting the source of the object, and intermingling of various noises in the process of interaction between subject and object, that is, information is the comprehensive result of these three aspects.

Because the source information to the destination information is the interactive result of the interaction between subject and object, and both subject and object are natural substances; All kinds of noises on the channel are also generated from natural materials. Therefore, "the generation of uncertain information is the inevitable result of material movement" [5-6]. Moreover, with the progress of society and the development of science, the systems involved in scientific research are becoming more and more large and complex, and the performance of uncertainty will become more and more prominent and complex, and the classification of uncertain information will become more and more difficult. Therefore, the theory and method of comprehensive treatment of uncertain information will become more and more important.

3. Basic principles of urban water environment ecological construction

In order to build a water ecological civilization city, water conservancy must go ahead. The report of the 18th National Congress of the Communist Party of China involves water conservancy work in many places, and puts water conservancy in a prominent position in the construction of ecological civilization. It not only further improves the water control strategy in the new period, deepens the connotation of water conservancy work, expands the development space of water conservancy, but also puts forward new and higher requirements for the reform and development of water conservancy. For these reasons, urban water environment ecological construction should always follow the following basic principles:

3.1. Priority is given to ecological and environmental protection

On the premise of meeting the basic requirements of flood control, flood control and drainage in urban water systems, the ecological environment protection of urban waters should always be placed in the most prominent position. While further strengthening the ecological environment protection, the impacts of human activities such as resource development and water disaster prevention and control should be strictly controlled within the allowable range of water resources carrying capacity, water environment carrying capacity and water ecological bearing capacity, and the natural attributes of urban waters should be respected.

3.2. Coordination between water conservancy and economic and social development

Urban water conservancy development should meet the requirements of economic and social development and provide support and guarantee for comprehensive, coordinated and sustainable economic and social development; The layout of economic and social development should adapt to the carrying capacity of water resources and water environment.

3.3. Combination of engineering measures and non-engineering measures

Based on the existing water conservancy projects in the city, taking the urban water system as the skeleton, an ecological garden city that meets the needs of water resources, water environment, water security and water ecology is established by integrating and optimizing the ecological corridors of green, forest, water and wind, and a circular ecosystem of "city and forest depend on each other and water and green reflect each other" is built [7]. While strengthening the construction of engineering measures for urban flood control and disaster reduction, water resources development and utilization, water resources and ecological environment protection, more attention should be paid to the construction of non-engineering measures such as comprehensive

management of urban waters, unified project dispatching and ecological compensation mechanism, and both engineering measures and non-engineering measures should be taken simultaneously to gradually achieve harmony between people and water.

4. Problems in ecological construction of urban water environment

4.1. Daily maintenance is not in place

The unregulated rivers are located in suburban areas, and their daily management work is relatively weak due to low maintenance funds. Some rivers have not been cleaned for a long time, resulting in river garbage deposition and overgrown aquatic plants. River systems intersect and run through, and a large amount of garbage and pollutants in unregulated rivers will flood into other rivers if they are not treated in time, resulting in the water environment of rivers in the whole city cannot be effectively improved.

4.2. No sewage interception and pipe collection project has been implemented

At present, the rivers in the suburban fringe and a large number of tributary rivers in the main city have not been rectified in time, and most of the surrounding areas of these rivers have not implemented sewage interception pipes, which is the biggest cause of water quality deterioration. In addition, the environment in the suburban junction is relatively messy, the pace of construction of various facilities is relatively lagging behind, the surrounding environment of the river is not in place, and illegal construction along the river and occupation of the river are serious. At the same time, due to the incomplete sanitation facilities around the river, domestic sewage is directly discharged into the river, and industrial waste water is smuggled occasionally. The dumping of garbage is common, which leads to serious deterioration of river water, widespread black odor and serious damage to regional environmental image.

4.3. The river system is not connected

For urban construction, some rivers need to be filled and blocked. In addition, long-term siltation also makes some rivers land filled, resulting in a large number of broken towns that are not circulating in the city. Because these broken towns have no source of living water, the rivers can't clean themselves, but the domestic sewage flowing into the river over a long period of time, garbage and even feces thrown by people along the river, make the river appear black and smelly; Moreover, the rainstorm season may also affect the urban flood control work, especially in the suburban fringe, which has seriously affected the lives of the surrounding residents.

5. Analysis of ecological construction and protection measures of urban water environment under uncertain information

5.1. Ecological construction of urban water environment

The construction of water ecological environment in urban areas mainly improves the external environment of water ecosystem through pollution source control and ecological water replenishment, improves the purification ability of water ecosystem through river ecological restoration and living water circulation, and strengthens the maintenance and protection of water ecosystem through necessary management. The above measures can be summarized as the solution of urban water ecological environment construction system, and the specific technical framework is shown in Figure 1.

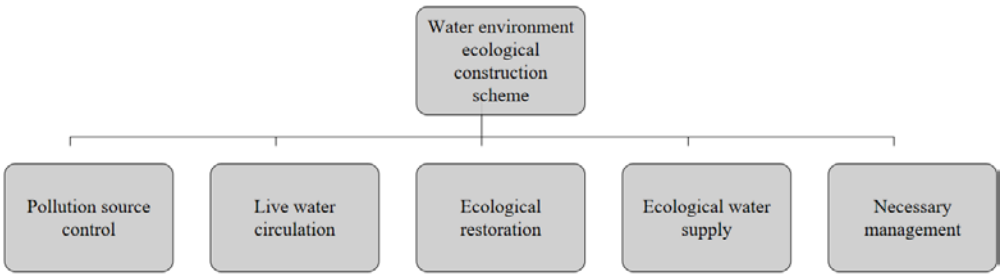

Figure 1 Technical framework of urban water ecological environment construction

5.1.1. Ecological hydration

In order to ensure the ecological water quantity of the river, maintain the ecological environment of the river and promote the flow of river water and the creation of landscape function, the uncertain information is used to analyze the ecological water quantity compensation guarantee measures of urban rivers. According to the analysis of urban natural environment and hydrology, aiming at the river form, the ecological water quantity of the river is guaranteed mainly through measures such as reclaimed water reuse, external water supply and new water storage project.

5.1.2. Chemical algae removal

Chemical algae removal technology controls the growth and reproduction of algae by putting chemical drugs into water, such as bromine dioxide, ferrous sulfate, copper sulfate and so on. Although this method is time-saving, labor-saving, simple and easy to implement, it is easy to cause secondary pollution to the ecological water environment, which can not fundamentally improve the water quality. On the contrary, with the continuous change of the varieties of chemicals and the increasing dosage, the vicious circle of urban water quality environment will become more serious, such as the decrease of biodiversity, fish death, dissolved oxygen, etc., which will seriously affect the structure and function of the ecological system and lead to the failure of the whole ecological water system to operate normally [8].

5.1.3. Using the food chain network of aquatic animals and plants to improve self-purification ability

Based on the analysis of uncertain information, the food chain network of organisms (a part of the ecosystem structure) and its symbiotic, competitive and autogenous functions are used to increase the ways and quantity of pollutant migration, transformation and output in water, prevent pollutants from accumulating in water and promote the virtuous circle of water. The main methods are:

1) Expand the coverage area of submerged plants at the bottom, increase their density, existing quantity and production, so as to fix the bottom mud, reduce re-suspension, absorb, transform and accumulate nutrients and organic carbon in plants, reduce the migration and diffusion of pollutants from the bottom mud to water, and promote and maintain the surface of the bottom mud to become an oxidized oxide layer through the oxygen generated by photosynthesis, so that the anaerobic metabolites in the bottom mud, such as ammonia, hydrogen sulfide and other toxic substances, can be oxidized into non-toxic substances.

2) Planting some floating plants and biological floating islands on the water surface can not only beautify the water body, but also inhibit and reduce the density and total amount of plank tonic algae and purify the water quality;

3) In order to improve the transparency of water and purify water quality, animals in water are used to filter plank tonic algae and organic debris.

5.1.4. Improve the guarantee system for optimal allocation of water resources

In the construction of water resources optimal allocation guarantee system, the government should pay attention to it and the whole society should participate; Strengthen management in accordance with laws and regulations and improve scientific and technological management

methods; Give play to the role of water price regulation and use price leverage to promote the optimal allocation of water resources; Establish and straighten out the investment channels and systems for optimal allocation of water resources.

5.2. Countermeasure of water resources protection

5.2.1. Strengthen legislation and improve water resources management system

In order to effectively protect water resources, water conservancy departments should formulate various water resources management methods and regulations as soon as possible, clarify the status, responsibilities and powers of water conservancy departments in water resources protection, and establish a perfect water resources management system.

First of all, establish the status of water resources protection institutions in the form of law, clarify their actual management rights, and strengthen the construction of river basin institutions. Secondly, water resources protection should be brought into the scope of market economy, and the sewage treatment fee should be raised to reduce water pollution economically. Finally, the water resources in the basin are planned in a unified way to ensure the ecological flow of the basin. On the premise of realizing the environmental quality goal of the basin, the water intake, total amount of sewage discharge and corresponding total amount decomposition goals are strictly implemented by legal, economic and administrative means.

5.2.2. Renovating and dredging rivers and promoting biological pollution control

Due to the advancement of urbanization, many rivers have become easy to eat away after land transfer. Therefore, in the areas where land is sold or about to be sold, all rivers under the jurisdiction of the city should be specially protected as public facilities of local towns, streets and development zones, and certain green public areas should be reserved at certain intervals before land transfer along the river as temporary storage yards for silt dredged by rivers in the future. District public finance should be subsidized every year. Give full play to the unique role of wet plants and aquatic plants in stabilizing river banks, improving water quality, increasing landscapes and protecting biodiversity, and truly create beautiful cities.

5.2.3. Carry out environmental protection publicity and education

In order to further promote the steady development of urban environmental protection in China, the urban construction planning departments in China need to scientifically carry out the publicity and education of urban environmental protection, thus calling on people from all walks of life to participate in the construction of urban environmental protection and promoting the sustainable development of ecological environmental protection.

In this process, the staff need to strengthen the publicity of ecological environment protection, so as to promote the residents' awareness of environmental protection and promote the steady development of environmental prevention work. In the actual operation process, the staff need to increase publicity through social media, and use various ecological environment protection websites for publicity. Workers need to actively carry out certain publicity work, so as to enhance environmental protection personnel and promote the promotion of environmental protection consciousness.

6. Conclusions

With the acceleration of urbanization in China in recent years, due to the diversification and artistry of eco-city construction, higher requirements are put forward for water resources and water environment protection and management, which often has the characteristics of difficult management and high technical content, which also puts forward higher requirements for eco-city construction and water resources and water environment protection and management. In urban water system planning, an overall coordination mechanism should be established to deal with the problems of overall planning of many departments and integration of multiple disciplines, and to sort out the relationship between urban water pulse system and urban water integration in the

overall spatial level of the city. On the basis of water conservancy project planning, through water ecological environment construction planning, the problems of "water security, water environment, water ecology, water landscape and water culture" in cities are well solved and their interrelationships are well coordinated, and the implementation and control of water system planning are guaranteed through water management planning.

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