

## The Construction of Ecological Management System of Urban Lakes: A Case Study of Wuhan

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### Abstract

This paper clearly sorts out the construction process of ecological management system of urban lakes in Wuhan by analyzing its three progressive phases. The ecological management system of urban lakes refers to the ecological management system dedicated to lake protection and ecosystem restoration. The management behavior of this system emphasizes the construction of the entirety and the systematicity of the lake areas, and it also highly concerns about the sustainable development of the regional economy and ecology as well as the widespread participation of the public and the stakeholders. Urban ecological management system based on an ecological treatment diagram with polyhydric cooperation allows urban lakes to fairly and sustainably meet the objectives and requirements of the ecosystem and human beings and ultimately achieves the “healthy ecological governance” of urban lakes.

**Key words:** Urban lakes; Ecological management; Wuhan; Waterfront

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### INTRODUCTION

Wuhan is located in eastern central China, having the reputation of “the city of a hundred lakes”. There are numerous lakes and ponds in the city. The water area of the whole city is 2,117.6 square kilometers, with a lake surface area of about 770 square kilometers. The city has 166 lakes and 40 lakes are under the management of central city administration.

With the changes of history, especially after the Ming Dynasty, a series of artificial activities such as building embankments and cities, reclaiming land from lakes and circling the lake for land etc. have greatly reduced the original natural landscape of urban lakes and continuously challenged its original fragile ecosystem. With the proposal of ecological concepts such as “ecological protection” and “sustainable development”, the various communities in Wuhan have paid an increasing attention of lakes and the call for lake protection is growing. In 1999, Wuhan promulgated the *Wuhan Protection Measures of Natural Mountains and Lakes*. In 2002, *Regulations on the Protection of Lakes in Wuhan* was promulgated. According to incomplete statistics, by the end of 2013, the city has developed more than 20 kinds of local laws and regulations to protect lakes, initially constructing the ecological management system of urban lakes.

The concept of ecological management originated in the United States. From the establishment in the 1970s, in the past 20 years, it has become a popular research and practice field. From the narrow sense, it is primarily for the specific operations in ecological environmental management, such as management concepts, methods, actors, goals and countermeasures and so on, and it constitutes a four-level system: emergent environmental

management, process management, industrial ecology management and system ecological management. Broadly speaking, ecosystem management refers to a system program which includes restoration and maintenance of health, productivity, biodiversity and overall lives. It tries to get all the stakeholders to actively participate in the interactions for the healthy development of human being and their living environment. This article's concern on the ecological management of urban lakes is established on a broad scope of management content, which is committed to protecting, improving and restoring the ecological

management organization of urban lakes and building efficient urban ecological management system so that the urban lakes can fairly and sustainably meet the objectives and requirements of the ecosystem and human beings thus to achieve "healthy ecological governance".

Since 1999, overviewing the construction process of the ecological management system of urban lakes in Wuhan in the past 15 years, we can divide it into three phases: the planning phase, the implementation phase, and the critical phase (Table 1).

**Table 1**  
**The Ecological Management Construction Phases of Urban Lakes in Wuhan**

Phase (Time)	Relevant ordinances and regulations
The planning phase (1999–2001)	Wuhan Protection Measures of Natural Mountains and Lakes (1999), Wuhan Protection and Definition Planning of Central Urban Lakes and Mountains (1999), Wuhan East Lake Watershed Protection and Management Approaches (2000)
The implementation phase (2002–2010)	Wuhan Protection Ordinances of Lakes (2002), Wuhan Trilateral Planning and Technology Management Regulations (2002), Wuhan Management Ordinances of Urban Parks (First Revision) (2002), Wuhan Central Urban Lake Protection Planning (2004-2020) (2005), The Implementation Details of Wuhan Lake Protection Ordinances (2005), Wuhan Urban Park Management Ordinances (First Revision) (2010), Wuhan Lake Remediation Management Approaches (2010)
The breakthrough phase (Since 2011)	Wuhan Protection Planning of the Ecological Framework (2011), Wuhan Central Urban Lake "Three-Line One-Road" Protection Planning (2012), Wuhan Greenway System Construction Planning (2012), Wuhan Lake Protection Ordinances (Revised) (2014)

## 1. THE PLANNING PHASE: 1999–2001

The years from 1999 to 2001 were the planning and preparation phase of ecological management of urban lakes. At that time, ecological problems caused by the spread of urbanization were under discussions all over the world. The concept of environmental protection increasingly became popular and accepted by people. As a capital city in central China, Wuhan has experienced several rounds of city expansion after the foundation of China. Mountains have been eroded; the water quality has been deteriorating; the ecological environment depending on mountains and water has been faced with serious challenges.

At the beginning of 1999, Wuhan started the protection work of urban lakes. The first thing was to define the "scope of protection". *Wuhan Protection and Definition Planning of Central Urban Lakes and Mountains* completed the initial demarcation and staking of 27 urban lakes, using GPS to determine the location and the water area of the lake. *Wuhan Protection Measures of Natural Mountains and Lakes* issued in the same period defined the ecological management responsible organization, protection level, and the land use within the range of control etc. for 27 lakes and 58 mountains. This ordinance clearly specified that the departments in charge for the protection work of urban natural mountains and lakes are the municipal department of planning and

municipal land administration management department. Water conservancy, forestry, environmental protection, municipal administration, gardening and other relevant organizations should take their own responsibilities.

From the relevant ordinances promulgated in the period, we can see that, the first urban lake ecological management was built on the management basis in the same "package" with mountains and then it gradually moved to a "single-unit" management. Through three years' planning in this period, urban city ecological management system gradually has a clear outline.

## 2. THE IMPLEMENTATION PHASE: 2002–2010

After a preliminary exploration and hatching, in 2001, Wuhan established its Water Affair Bureau and clarified its functional duty in the management work of lake protection. Since then, the water administrative department has officially become the management department of lake protection. At the end of 2007, the Municipal Commission for Public Sector Reform approved the Water Affair Bureau to create a lake protection management office. In early 2010 in the third setting of the offices of the Municipal Water Affair Bureau, it adjusted the setting of the Office of Lakes and Reservoirs to undertake the function of the protection work of lakes in this city.

In 2002, Wuhan officially introduced a local regulation, *Wuhan Lake Protection Ordinances*, which is regarded as a milestone event in construction of ecological management system of urban lakes. It clarified that the lake number within the protection scope is 166 in total and the lake area is 803.17 square kilometers, of which there are 40 lakes in the central of the city. Meanwhile, the only technical indicators for controlling construction along the lake, *Wuhan Trilateral Planning and Technology Management Regulations*, *Wuhan Management Ordinances of Urban Parks (First Revision)* in which the regulations have been formed in terms of management content of lakes and parks, and some other regulations and ordinances were also introduced in 2002.

Thereafter, in the management implementation led by the water administrative department, Wuhan has continued to refine ordinances and regulations and improve the lake ecological management system. For example, *The Implementation Details of Wuhan Lake Protection Ordinances* (hereinafter referred as the "Details") promulgated in 2005 to be carried out has clarified the division of responsibilities between the departments concerned to protect lakes. It has also standardized and legalized the beneficial practical experiences in the protection of lakes. In 2010, *Wuhan Lake Remediation Management Approaches* (hereinafter referred as "Approaches") was promulgated. It regulates the lake remediation activities within the municipal area and strengthens the protection of lakes and the governance of water environment.

After that, the ecological management system has fully entered the implementation phase. The downtown lake remediation work has overall been carried out. In 2002, with the state's 863 "15" major projects of "the technology to improve the quality of water environment in the city and the comprehensive demonstration", Wuhan first started the implementation of the rehabilitation work of the ecological water network of rivers and lakes in Hanyang. In 2005, Wuhan was approved to be one of the first batch of pilot cities in China for the protection and restoration of aquatic ecosystems. In 2009, before the 13<sup>th</sup> World Lake Conference was held, Wuhan became the first city in the country to pass the inspection of the pilot work for the protection and restoration of aquatic ecosystems organized by the Ministry of Water Resources, leading the city's lake protection work go in depth. Since 2005, the implementations of lake treatment projects within the city, such as "a lake with a view" project, shoreline ecological stabilization and the construction of Large East Lake water ecological water network, have changed the appearance of many lakes in the city. It is widely acclaimed by the citizens of the city.

This phase has started the prelude of the construction of ecological management system of urban lakes. Wuhan has been on track of ecological management of urban lakes.

### 3. THE CRITICAL PHASE: SINCE 2011

In nearly 10 years' ecological management implementation in the last phase, both the promulgation of laws and regulations and the implementation of specific project were dominated by the water administrative department and various governmental departments participated in the management and project implementation. The ecological management of urban lakes was orderly carried out and conducted led by governmental departments and the public was in a state of passive acceptance.

In 2011, the municipal committee and the municipal government launched a "liability storm" and implemented a "plan to treat incompetent officials". In November, *TV Politics* was held. So far, the programme has been held three times, becoming an important platform for Wuhan municipal governmental work. In these years' "politics", the issues related to urban lakes are very prominent. Questions raised on site are very sharp and the Director of Water Affair Bureau has frequently faced embarrassing situations. The general citizens seem to be catching up a course on lake protection overnight and the concept of lake ecological management is rapidly spread. After the *TV Politics*, the public at all levels are eager to participate in this campaign. Voluntary organizations like "Love Lakes" and "Green Jiangcheng" and lake protection guards like "Mr. Liu for Wanzi Lake" appear one after another. Complaint phone calls on lake protection flock to major news media. All these have a great impact on the original top-down decision-making process in lake ecological management system and it increases the force of supervision. In the process, various social conflicts around the urban lakes sharpen; confrontations and dialogues have become common forms of participation. The ecological management of urban lakes has entered the critical phase.

Attention of the whole society has brought unprecedented pressure to the work of the governmental administrative departments. Efforts to construct the ecological management system of urban lakes continue to increase. In October 2011, the Municipal Commission of Public Sector Reform approved the establishment of Municipal Lake Protection Administrative Bureau to take charge of the protection, management, governance and supervision of all work on lakes in the city. This is the first Lake Bureau that has been established in China. In 2011, known as the "ecological bottom line", the most stringent control program, *Wuhan Protection Planning of the Ecological Framework* was launched and it conducts strict ecological control of the ecological resources in the city including lakes; in 2012, *Wuhan Central Urban Lake "Three-Line One-Road" Protection Planning* refined the three control lines and roads circling lakes for all the 40 lakes in the central city and clarified the main responsible body of each controllability. In 2013, the establishment of Wuhan Lake Protection and Management Leading

Team with Mayor Tang as the team leader and the launch of “Lake Director System” by appointing the Director of each district as General Lake Director have implemented the highest body of responsibility. Lake assessment system has been widely spread within the city. In addition, the release of *Wuhan Lake Distribution Map*, the setting of blue line boundaries of all 40 urban lakes, the construction of 52 km ring roads along lakes, and codification of *Lake Records* have completed the construction of ecological management system of urban lakes from various aspects. Entering 2014, after 12 years of hardship, *Lake Protection Ordinances* has faced the major examination for the revision, which will be submitted to the Standing Committee of the People’s Congress of Wuhan for review in July of 2014.

In this phase, the effects of integrated treatment of the water environment of lakes begin to appear. The situation that the lake water quality is getting better is more evident and stable. Meanwhile, urban lake areas have become new landmarks of a livable city. The 22 lake parks built in the central city become good places for residents nearby for leisure and fitness. As the startup project of the construction project of the Large East Lake ecological water network, East Sha Lake connectivity project was completed in 2011. When the Han Street located on the Chu River was open, it has immediately become a popular tourist sight in Wuhan, which significantly promotes the surrounding economy.

Up to then, the protection of lakes and promotion of the ecological landscape construction in lake areas have become a “public policy” highly concerned by the Wuhan municipal government and the city’s 10 million citizens. The ecological management system of urban lakes has formed which is led by Wuhan Lake Bureau and co-managed by different levels of planning and gardening departments. With the continuous improvement of the construction of the ecological management system, the appearance of urban lake areas changes every day and the city’s livability index increasingly rises.

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## CONCLUSION

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The above analysis of the three phases clearly sorts out the construction process of the ecological management system of urban lakes in Wuhan in the past 15 years. We can see that, the construction process has been constantly updated and adjusted with the progress of the times. It has gone to “joint management” mode from the original chaotic situation of “package management”; the protection and ecological system restoration of a single lake has been expanded to the ecological control planning of the whole city; the sustainable development of ecology is more relevant to the prospects of the regional economy.

Therefore, for a urban ecological management system based on an ecological treatment diagram with polyhydric cooperation, its management behavior should emphasize the construction of the integrity and the systematicity of lake areas, no longer just a simple sense of restoration of natural areas. In the process of urbanization, it should be led by the governmental departments and participated by the public. The principle of fairness and efficiency should be insisted to conduct an ecological management implementation process of urban quality public natural space. The comprehensive exploration of how to achieve a win-win situation of environmental treatment and economic development is also the direction to which the urban ecological management of urban lakes should put its efforts in future for the ultimate goal of “healthy ecological governance”.

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