Study on the Comprehensive Mechanism of Hangzhou Water Landscape Governance
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Abstract: The article is to analyze the spatial structure, type structure and the existent main problems of water landscape in Hangzhou. Aiming at “clear water, liquidity, green bank, beautiful scenery, livability, prosperity”, the tasks and construction targets of the mechanism of Hangzhou water landscape are studied form the perspectives of wellhead protection zone, transport water landscape and urban water landscape. In order to solve the problems like dirty, black and odorous urban water, the guiding ideology and comprehensive governance measures are proposed.

Introduction
Water landscape is water-oriented. It is different types of water landscape formed of geological landform, climate, biology and human activity. Urban water landscape has already become leisure and travel places for residents. And some become the business card and symbol of the city, which drives the development of the urban tourism economy. However, water landscape is the most vulnerable part of the urban environment and is easy to be polluted and environmentally damaged. Therefore the governance of water landscape has multiple effects. It also involves a number of disciplines and needs to be considered through the aspects such as human settlement and tourism landscape.

Reserve Analysis of Water Landscape in Hangzhou

Quantity and value of water landscape. The monomer number of tourism resource in Hangzhou is 2707, among which the monomer amount of water landscape is 152, accounting for 5.62%. The monomer amount of urban water landscape is 99. The average density of urban water landscape is 3.2/hundred km2. Although the quantity is not large, they are valuable, such as the West Lake, Xiangu Lake, the Grand Canal, the Xixi Wetland, the Tiger Spring and so on. The water landscape is mainly concentrated in the city. It can be divided into five inland water landscapes: the canal part, Shangtang River part, Xiasha part, Shangqiu part and river south part. Though its distribution is limited, the implication is wide and the driving force is strong. The quantity, reserve and quality of water landscape in Hangzhou mainly focus on Shangcheng District, Xihu District, Gongshu District. The spatial difference of the average quality is little.

Diverse types of water landscape. In the six large subclasses of reach (BA), natural lake and pond (BB), fall (BC), spring (BD), estuary and sea (BE) and ice-snow area (BF), Hangzhou occupies five, having no ice-snow area, with the coverage of 83.3%. There are 32 reaches, 41 natural lakes and ponds, 53 falls, 25 springs and 1 estuary and sea.

The reserve abundance of water landscape. There are 152 existent ranked ones. Due to the natural and cultural connotation, the city is of high value, based on its cultural and historical significance. There are 6 fifth level monomers, 7 fourth level monomers, 33 third level monomers, and the reserve value is 463. There are 15 third level water landscapes among the 99 monomers in the city, account for 15.15%.

As a whole, the water landscape in Hangzhou has diverse types. It forms the landscape of natural mountains and rivers, and has high value monomers in each type. But the river landscape relevant to the resident life still has serious problems. The present situation of river environment quality is
not optimistic. The main problems are: the environment is destroyed and the self-purification capacity of the water ecosystem is weakened; the riparian is processed stiffly, so the hydrophilicity is bad and featureless; the continuity and systematicness of the landscape is not strong; it lacks comprehensive function, vitality, cultural inheritance and succession; the public participation is poor, and the management is weak.

The Governance Tasks of Hangzhou Water Landscape

Water landscape is different from other landscapes. Its governance should be based on the purposes of water and air purification, ornamental waterscape beautification and leisure waterscape greening, so as to ensure the public safety of drinking water, the hydrophilic smoothness, and the water cleaning; to balance the demands of production, life and ecology; to realize the scientific planning, effective protection, optimize the allocation and utilization; to reflect the “Better City, Better Life” principle; to take different measures for different types of water landscapes.

Water Source Protection Area

Hangzhou has mainly two water sources: the Qiantang River and Dongtiaoxi River. The daily water supply of the Qiantang River is 1.45 million tons, while that of Dongtiaoxi River is about 0.25 million tons. 80 percent of drinking water in Hangzhou comes from the Qiantang River. 95.5% of the city controlled sections of the mainstream and tributaries of the Qiangtang River have achieved or are better than the third criteria. The compliance rate of water environmental functional area is 86.4%. The water source is single and the ways to get water is unique. If the water source is contaminated, the lifelines for Hangzhou are the two alternate water sources in the urban area (the reservoir besides coral sand and the Tiesha River) and the newly constructed the Xianlin Reservoir. But compared to the entire urban water consumption, these water reserves are inadequate. Currently the Qiandao Lake Diversion Project has also started. The main tasks for the governance of the water source landscape are:

Short-term objective: to focus on strengthening water conservation, removing pollution source, clean water diversion, making water quality basically reach the second criteria.

Long-term objective: on the basis of water quality standard, to expand the scope of the ecological conservation areas, strengthen the ecological construction, return to the original ecological landscape.

Specific measures: governments at all levels should instruct the authorities, as well as the planning and environmental departments to strictly enforce the relevant water source protection regulations; to establish and improve the conservation of water environmental monitoring network and to take concrete and effective measures; to make rectifications within a time limit and relocate the polluting enterprises in the water protected areas; to decrease emission and strictly prevent additional water pollution.

Transport Water Landscape

Hangzhou transport water landscape mainly concentrates in the Beijing-Hangzhou Grand Canal (Hangzhou section) and the waterbus routes in the city. The Grand Canal starts from Tangqi in Yuhang on the north and ends to the Qiantang River on the south. It is about 39km, throughout Yuhang, Gongshu, Xiacheng, Jiang’gan Districts in Hangzhou. Among the 40 odds landscape nodes along the east and west sides, there are traditional landscapes like Hushu Eight Sights, and unhistorical sites such as Gao’s Garden, Yang’guan, Sang Lu, and so on. The eastern landscape includes: North Star Park, Canal Cultural Square, Qingsha town, Hecheng Square, Fuyicang Cultural Park, Royal Pier, Zhong Pavilion. The western landscape includes: LOFT Cultural Park, Qiaoxi Historic Preservation District, Xiaohe Historic Preservation District, Canal business district, Zuohou Pavilion, Halfway Red Spring. The main tasks to transport water landscape governance are:

Short-term goal: to strengthen the matched construction of tourism element, beautify the environment, dig canal culture, and design reasonable tourist route.
Long-term objectives: to consider the matched tourism function of water transportation facilities; to increase the viewing platform, sightseeing corridor and other supporting facilities and matched constructions.
Specific measures: to excavate and protect the canal culture; to green and beautify the shores along the local waterbus route; to construct tour facilities at the same time therefore to realize the functions of water transportation travel. To accelerate the “Five Waters” Project as soon as possible and the navigation of the Xianghu River.

Urban Water Landscape

The water landscape in Hangzhou is mainly concentrated on the Qiangtang River, the Grand Canal, the West Lake, the Xixi Wetland, and the mainstreams in the city. The urban water landscape is focus of the governance in Hangzhou. Recently the river governance and the comprehensive protection project are strengthened, but water pollution still exists in some areas, especially the economic development zone. The main tasks for the governance of the urban water landscape are:

Short-term objectives: to set the elimination of black and odor water as the key and the improvement of water quality as the center; to take greening and architecture for humanity on the riversides into account; to regulate the existent pollution source of the river; to strictly control the additional pollution.

Long-term objectives: to strengthen the construction of ecological construction, system construction and environmental moral construction; to gradually achieve the ecology landscape and create the “Oriental Venice”.

Specific measures: to seriously implement Hangzhou Urban River Construction and Management Regulations; to improve the supervision mechanism; to establish river management standards; to explore ways of long-term river management; to eliminate the black and odor river and improve the water quality; to improve the river by eliminating v-class indicators; to pay special attention to the construction and governance of urban river; to promote the projects of dredging, injecting clean water, ecological management, keeping water courses clean, etc.; to establish a complete coverage of all-weather monitoring of environmental pollution and sewage pollution treatment system.

Comprehensive Governance Mechanism of Water Landscape in Hangzhou

Using a Variety of Engineering and Technology Combination Measures

Water landscape is a complex system. To create a clear and natural water landscape, it is necessary to take full advantage of the ecosystem, but also to have forced treatment on the waters that goes beyond self-purification system function. At present, we should set “improving water” as the core, and enhance the function and quality of water. To set the infrastructure construction and river regulation as the breakthrough point, and fully implement the six-in-one measures—“intercepting polluted water, regulating river, water diversion and distribution, agriculture prevention and control, ecological restoration, scientific supervision”. To improve water quality, technically, we should first use the intensified purification technology. And then transfer from the physical method to the natural and biological purification based methods, supplemented by physical and chemical methods. For the comprehensive treatment and long-term maintenance of the heavy polluted river, we should follow the procedures of: management system reform - ecological ethics, environmental ethics and conduct regulation - interception - Dredging - oxygen injection- biological and ecological purification and restoration - hydrodynamic circulation.

Integration of Functions of Each Department and the Realization of Unified Regulation and Construction

To break the administrative system, to form the management committee of water improvement, and to realize the unified and effective river governance. Rivers in Hangzhou are now governed by more than one departments, which are responsible for public management at the same time. They are to accept the approvals concerning river, which has obvious nature of administrative
institutions. It is suggested that under the framework of the current administrative departments, management committee of urban water improvement should be established to integrate the resources of the relevant departments, to find the leaks of the policy and therefore to supplement and perfect them. The river governance should be considered as part of the government assessment. The river protection, improvement, pollution control, management, development and other water affairs should be managed in unified way. The “unified water affair management” is to be adopted. A law enforcement team is formed to provide a legal basis and guarantee for river management.

To carry out a comprehensive management of river pollution and to reduce the influence of exogenous pollution on endogenous pollution. To strengthen the cooperation between regions, upstream and downstream, different districts by connecting the relevant departments of water conservancy, environmental protection, urban management, so as to obtain good co-management of urban river. The urban riverside (especially the suburban riverside) industries, enterprises and family workshops should be checked in order to crack down the violations, therefore to promote the projects such as intercepting polluted water and the construction of the matched facilities. And to realize distribution of rain and sewage as soon as possible, decreasing exogenous river pollution. In accordance with the principle of territorial management, supervision and evaluation of the territorial government should be strengthened on the basis of water quality monitoring and assessment. The departments of urban management and environmental protection should cooperate closely to reach the sharing of the data of water quality monitoring; regular joint conferences should be held to solve the common problems and difficulties encountered during the work.

**To Explore the Governance Mechanism of Combining Economy and Engineering Technology Methods**

To introduce market mechanism, to unify management and develop channel, to innovate management mode. To transfer form passive to active management; to have effective regulation, development and construction of river; to solve the problems of the system and inadequate funds; to create ecological, social and economic benefits. The form of project contracting is recommended. The whole river is a unit, calling for bids at home and abroad. The local government is responsible for all the standards of the basin runoff and the drain, while the contractor is responsible for reaching the standards of water landscape indicators. On this basis, the contractor should get paid yearly. For sewerage and separation, the competent department should charge according to the pollution’s administrative difficulty and cost. And hand it over to the third-party or the government, so as to avoid the behaviors such as stealing emission, diluting “standard”, or using penalty to replace treatment.

To use economical methods to solve funding problems. To carry out the pilot work of “water” support “water”, “bank” support “bank”, so as to solve the financial problems during the long-term management. “Water” support “water” is to allow cleaning staff to protect and feed fishes in the suitable region, therefore to reduce eutrophication, improve water quality and increase staff income; “bank” support “bank” is that the cleaning staff are responsible for the river banks by planting flowers with high economic value so as to increase their income, green the banks and beautify the environment.

To optimize the industrial structure and to establish ecological Hangzhou. Industrial restructuring and rational distribution plays a key role in water landscape maintenance. Hangzhou should adhere to the “three, two, one” industrial development policy, giving priority to the development of modern service and advanced manufacturing. Put speeding up the development of modern service gathering part as the breakthrough. Enhance the level, size and energy level of service.

**To Combine Nature and Humanity, to Strengthen the Cultural Connotation Construction of Water Landscape**

To be innovative, and to explore the river culture. “Bridge, river, home” is the picturesque scene in the history of Hangzhou, and people still miss this original ecology of life. Taking the opportunity of the inscription of the Grand Canal and setting the reproduction of the ancient culture of middle river and eastern river as the template, an all-around construction of river culture is built. Historical
cultural heritage of the urban river is explored. And the civilization of water transportation, water tourism, and water markets are reproduced. It’s the coordinated development of ecological civilization and river culture.

To make use of news media, and to carry out publicity and education activities. To let the residents be aware of the causation between their daily behavior and the river ecology through multiple perspectives and angles, especially to popularize the health education of the close relationship between the river pollution and human. Laws and regulations for the local, village and community should be formulated; governance system of rewards and penalties should be explored; garbage pollution to the river should be reduced; report of illegal behaviors should be encouraged.

To increase cultural sculptures and famous poems on the banks. Hangzhou is a historical city, for which many poems and works are created to praise its beauty. These heritages reveal the history and culture of Hangzhou by means of the sculptures, stones, and water cultural corridors, which enhances the literacy and taste of the citizens.

Conclusion

The governance of water landscape should comply with the objective laws of landscape ecosystem and fully consider the technical, economic and cultural factors. To plan the construction tasks scientifically and built the reasonable scientific planning-to combine the economy and engineering technical method-the policy matching comprehensive mechanism. To start from the source, we should pay equal attention to the governance and the interception, to match the technology and policy, and to create harmony between human and water.

References


