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RESEARCH ARTICLE

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Research on the Protection and Inheritance Strategy of Water Cultural Heritage in the Huai'an Section of the Grand Canal

Guangming Zuo[1,*]
[1]*Huaiyin Institute of Technology, China*

Abstract: By analyzing the morphological characteristics of the water cultural heritage in the Huai'an section of the Grand Canal, this paper explores the protection and inheritance strategies of the water cultural heritage in the Huai'an section of the Grand Canal. Based on different characteristics of the canal's cultural heritage, different protection measures and suggestions are implemented to promote the scientific protection and rational utilization of the water cultural heritage in the Huai'an section of the Grand Canal.

Keywords: Huai'an section of the Grand Canal, water cultural heritage, protection and inheritance, strategies

The Grand Canal is the only huge engineering system in the world that is invested and managed by the state to ensure the safety of food transportation ("water transportation"), achieve the goal of stabilizing political power and maintaining imperial unity. However, with the process of urbanization, the Grand Canal is faced with such prominent problems as increasing water pollution, destruction of Material culture remains, excessive commercialization, and lack of cultural elements. Strengthening the protection of the Grand Canal's heritage and cultural inheritance is extremely urgent.

1. Clarify the Cultural Heritage Form of Dayun River in Huai'an Section

Huai'an is a national historical and cultural city with a long history and a rich collection of people. During the Qin Dynasty, counties were established, and during the Sui and Tang dynasties, they became the transportation hub and salt fortress of the Grand Canal. During the Ming and Qing dynasties, they became one of the "four major cities" along the Grand Canal. According to the "Heritage Protection Plan for the Huai'an Section of the Grand Canal" (Huai'An Cultural relics bureau. 2010), there are a total of 93 types of heritage sites remaining in the Huai'an section of the Grand Canal.

1.1 Cultural Heritage Forms of Water Conservancy Engineering

The cultural heritage of the Huai'an section of the Grand Canal in terms of water conservancy engineering can be divided into five forms: river channels, gate stations, shipping engineering, management facilities, sacrificial culture, and archives and literature (Chu, 2018).

Rivers and gates: Huai'an section of the Grand Canal and its embankments and wharves, Huai'an section of the old Yellow River and its embankments, Guishan Canal and its wharves, Chuzhou Wenqu, Zhangfu River, Laojian River (Chuzhou section), Yanhe River (Huaiyin section), Dakouzi Xiaokouzi Site, Hongze Lake and its embankments, Qingkou Water Control Project Site, Qingjiang Gate, Ancient Mokou Site, Ancient Qingkou Site, Jixin Gate, Zhuluo Dam, Wangying Water Reducing Dam Site (West Dam) Yanhetou Shuangjin Gate, Huaiyin Water Conservancy Hub, Huai'an Water Conservancy Hub, Yangzhuang Control Gate, Longguang Gate, Yaohe Gate, etc; Shipping engineering: Ruofeiqiao, Wudun Ferry, Xiba Laochuantang, Yangzhuang Yunkou, etc; Management facilities: the ruins of the Governor's Office for Water Transport, the ruins of the River Governor's Office, Qing Yan Garden, Fengjicang, Huai'an Chaoguan Ruins, Qingjiang Pulou, etc; Sacrificial culture category: Huiji Temple Site and Huiji Temple Stele, Zhenshui Tieniu, Wu Gong Temple, Chen Pan Er Gong Temple, etc;

Corresponding Author: Guangming Zuo
Huaiyin Institute of Technology, China
Email:823872339@qq.com

Archives and documents: historical river engineering archives, historical canal maps, historical canal transport and salt transport archives, historical canal steles, historical local chronicles of Huai'an, modern and contemporary canal research documents, etc.

1.2 Forms of Urban Relics Cultural Heritage

There are a large number of urban cultural heritage sites along the Huai'an section of the Grand Canal, including ancient sites, ancient buildings, ancient towns, and stone carving culture (Zhu, 2016).

The ancient sites include Xuyi Sizhou City Site, Huai'an Ancient City Wall Site, Ganluo City Site, Hanxin City Site, etc; Ancient buildings include the gathering place of the Five Cults in Qingjiangpu, Wentong Tower, Huai'an Prefecture, Zhenhuai Tower, Pei Yinsen's Former Residence, Wang Xianfa's Former Residence, Yang Dianbang's Former Residence, etc; Ancient towns include Wharf Town, Hexia Ancient Town, Wangying Town, Xiba Town, Jiangba Town, Guishan Town, etc; The stone carving culture includes the Qianlong Yuehe Imperial Poetry Stele, the Kangxi Qianlong Imperial Stele, the First Mountain Inscription, and the Bronze Bell in Shaohu Park.

1.3 Forms of Natural landscape cultural heritage

Huai'an section of the Grand Canal is rich in cultural heritage of Natural landscape. Hongze Lake, Sheyang Lake, Baima Lake, Gaoyou Lake, Baoying Lake, Shanzi Lake, etc. have created the scenery of Huai'an. There are Zhongyun River Ecological Environment Protection Zone (Zhuluoba Qingkou) and Huai'an District Three Lakes and One Yin Landscape Environment Zone in the urban area.

1.4 Form of Intangible cultural heritage

There are 27 forms of Intangible cultural heritage in six categories in Huai'an section of the Grand Canal, including canal related myths and folklore, folk customs, traditional folk songs, dramas, dances, traditional skills, related place names, couplets, ancient poetry and ancient prose.

2. Characteristics of the Dayun River Cultural Heritage in the Huai'an Section

During the Ming and Qing dynasties, Huai'an had always been a hub for north-south water transportation, a key hub for governance and a hub for the main river, playing a particularly important role. The construction and evolution of the Huai'an section of the Grand Canal can be said to be a microcosm of the history of ancient Chinese water conservancy development, so the water cultural heritage of the Huai'an section of the Grand Canal has its own distinct characteristics (Cao, & Wu, 2018) (Li , 2015).

2.1 The cultural heritage of the Dayun River in the Huai'an section has a wide variety of types and a long history, with high technological value

Huai'an has witnessed almost every important period of the development of China's Grand Canal. From the Hangou dug by King Fuchai of Wu in 486 BC, to the Sui Tang Canal dug by Emperor Yang of Sui, and then to the Beijing Hangzhou Grand Canal, which cuts the bend and straightens, Huai'an has always been an important channel to connect the Yangtze Huaihe River and the Yellow Huaihe River, and ensure the smooth flow of the canal from north to south. In order to cope with the large amount of sediment accumulation caused by the diversion of the Yellow River, the Ming and Qing dynasties implemented large-scale water conservancy projects in the Qingkou area of Huai'an, in order to achieve the idea proposed by the Ming dynasty water conservancy expert Pan Jixun of "storing and cleaning the Yellow River, harnessing water and attacking sand, and ensuring water and transportation". The Qingkou Water Conservancy Hub represents the highest technological value of the agricultural civilization era in terms of engineering planning, engineering design, and even engineering technology.

The heritage sites of the Grand Canal World Heritage are distributed in four counties and districts of Huai'an City, with the area of the heritage area and buffer zone exceeding 100km2. At present, Huai'an has two heritage sites (Qingkou Junction, the ruins of the Governor of Water Transport), one section of the river (Huai'an section of the Huaiyang Canal), and five heritage sites (Qingkou Junction, Shuangjin Gate, Qingjiang Gate, Hongze Lake Dike, and the ruins of the Governor's Office of Water Transport) included in the World Heritage List. The Qingkou Water Conservancy Hub is composed of multiple heritage sites. In the protection plan of the Huai'an section of the Grand Canal, the Qingkou Water Conservancy Hub Special Protection Plan involves more than 60 various hydraulic facilities, including multiple rivers such as the Zhangfu River, Taiping River, Ancient Yellow River, and Salt River, as well as various hydraulic facilities such as gates, dams, weirs, embankments, and diversion piers. There are various

hydraulic technologies such as masonry, masonry, and wooden dragon. Most of the hydraulic facilities and technologies in China's thousands of year history of canal development can be found as examples in Huai'an.

2.2 The cultural heritage of the Dayun River in the Huai'an section is a living feature with the characteristics of long lines and unclosed protection

After more than two thousand years of continuous development and evolution, the Grand Canal still plays an important role in transportation, flood discharge, drainage, irrigation, water supply, promoting the construction of coastal towns, developing tourism, and improving the ecological environment. It has the characteristics of long lines and unclosed protection. At the same time, the canal heritage of Huai'an has become an important symbol of the Urban culture of Huai'an. The canal in history has brought merchants and prosperity to Huai'an. Various things related to the canal have become the cultural gene of Huai'an spirit. The canal cultural factors have been melted and implanted into the lives of ordinary people today.

3. Strategies for Protecting and Inheriting the Cultural Heritage of Dayun River in Huai'an Section

3.1 Effective Management and Protection of the Water Conservancy Function of the Huai'an Grand Canal

The Huai'an section of the Grand Canal has a long history and has always been responsible for water conservancy and transportation functions. After the founding of the China, the Huai'an section of the Grand Canal was expanded. In 1958, new urban watercourses were opened, and the old canal still connected with the new river. After the comprehensive planning and management of the Beijing Hangzhou Canal in 1982 and the renovation during the construction period of the Beijing Hangzhou Canal after 2000, the current appearance of the Huai'an section of the Grand Canal has been formed. The river channel undertakes functions such as urban flood control, drainage, navigation, industrial ecology, and farmland irrigation, and is also the second cascade water conveyance channel of the East Line of the South to North Water Diversion Project.

(1) Flood control and embankment management. Influenced by the high water level of the main irrigation canal, the canal in Huai'an City has the function of flood control. It is necessary to conduct inspections and management of river embankments to prevent and stop illegal incidents.

(2) Drainage. On the canal, there are 24 waterlogging drainage pumping stations in the main urban area of Huai'an City, including Yuehe Pump Station and Shanyang Pump Station, with a total installed capacity of 12609 kW and a total drainage capacity of 180 m3/s.

(3) Industrial water intake and shipping. The southwest chemical sheet factory in Huai'an City has the demand for industrial water intake and ship transportation. After years of dispatching and operation experience, the water level in the urban reaches of the Grand Canal and the Li Canal should not be lower than 9.3 m.

(4) Irrigation of farmland. Since the main canal is connected with the water level of the Grand Canal and the urban section of the Li Canal, at present, the diversion outlets of many irrigation areas in Huai'an City, such as Qubei, Qunan, Yunxi, Shejiaba, Shunhedong, Zhouqiao, are distributed along three river basins. The river channels also undertake farmland irrigation tasks from May to September every year, with huge water consumption. During the peak period of water use, the contradiction between urban industrial shipping and landscape water use is prominent.

(5) Ecological environment water use. In recent years, the urban water ecological environment has become increasingly important, and the demand for ecological water has significantly increased.

We have built multiple urban water landscapes such as Bochishan Park, Forest Park, and Shitahu Park, improved the water environment of multiple urban river channels such as Qing'an River, and built multiple pump stations such as Yuehe Pump Station, Gaojiaxiang, and Xixiaozha to improve the water quality of urban water channels.

(6) An important water transmission line for the South to North Water Diversion Project. Huai'an City, located in the first section of the South to North Water Transfer Project, namely the Yangtze River Hongze Lake, plays an important role in the South–North Water Transfer Project.

(7) Ensure the landscape water level of the Grand Canal Cultural Corridor. The construction of the Li Canal flood control Control engineering has been

completed to control the Huaihe River flood outside the main urban area and reduce the water level of the Li Canal in flood season; During non flood seasons, ensure that the canal in the urban area has a certain level of landscape water, so that the city and water are closely integrated, highlighting the water charm characteristics of the canal city.

3.2 The History of Respecting the Dayun River Culture in Huai'an Section

Cultural heritage is a wealth of cultural value created by humans in social and historical practice. In the past, people did not pay enough attention to the protection and management of the Dayun River cultural heritage, and there were many urgent problems that needed to be solved. The water conservancy authorities have taken the initiative to consciously carry out the protection of water cultural heritage, made innovative practical explorations and attempts, and achieved fruitful results.

In order to further highlight the regional characteristics of the "Canal City", ensure the smooth, lively, clean and waterscape of the Li Canal, and have the functions of flood blocking, drainage, ecological water replenishment, navigation, urban landscape and urban transportation, Huai'an Water Resources Bureau completed the Huai'an Li Canal flood control Control engineering in 2016, with remarkable results. The project is composed of Beimenqiao Control engineering and Tangzixiang Control engineering, and the jointly controlled river section is 16.8 km long.

During the construction of the North Gate Bridge Control engineering, the Gongchen Gate and the city wall ruins of Qingjiangpu Ancient City were found. In order to do a good job in cultural relic protection, the Municipal Water Resources Bureau and the Municipal Cultural Relics Bureau closely cooperate and invite the Jiangsu Provincial Archaeological Research Institute to prepare a cultural relic protection plan. The final decision is to protect the discovered cultural relics on site and display them in their original locations.

In order to further enhance the Control engineering of the North Gate Bridge and the cultural atmosphere of the canal radiating around it, and reflect the long history and profound cultural heritage of the North Gate Bridge, the Huai'an Water Resources Bureau invited the city's cultural and historical experts to name the four bridge pavilions and arches, create couplets for the bridge pavilions and arches, rebuild the monument of Pubei Gate Bridge on the Qingjiang River, and invite calligraphers to write the bridge name, pavilion name, couplets, and bridge notes, Design the pattern of the railings on the Linhe River as a symbol of China Water Conservancy and Huai'an Water Conservancy. The railings on the bridge railings are double-sided reliefs, and the carving content adopts the water related part in the "Hongxue Eternal Map" written by Yan Linqing. Pave handmade bluestone pavement on both sides of the river, set up night scenery lighting, and set up leisure seats to create a good waterfront space environment for the Li Canal. Set up a trestle in the city wall site protection area to create a three-dimensional spatial environment. At present, Beimenqiao area has become a landscape node of Urban culture embodying the history and connotation of Qingjiangpu, meeting the needs of people for stopping, viewing, experiencing, leisure and other activities. At the same time, Huai'an Water Conservancy Bureau organized the compilation and publication of the book "Beimen Bridge" (Huai'an water resources bureau. 2017), recording the "past and present life" of the Beimen Bridge, becoming the "registered residence file" of the Beimen Bridge, which has been widely praised by readers.

The Control engineering of Beimen Bridge is an important part of the cultural corridor of Huai'an Grand Canal, and it is also a successful example of the organic integration of water project construction and water culture construction. At present, the cultural corridor of the Huai'anli Canal has an annual tourist visit volume of over 1 million people.

3.3 Comprehensively showcasing the cultural characteristics of the Dayun River in the Huai'an section

In order to deeply explore the historical value of canal culture and integrate canal elements into the urban image recognition system, the open and inclusive characteristics of the Grand Canal are condensed into the new era Huai'an spirit of "embracing the world and rising the Jianghuai River". Huai'an water conservancy personnel closely adhere to the local characteristics of canal cultural heritage and carry out water conservancy scenic area construction and water culture activities. The ancient canal water conservancy scenic spot is located in the urban area of Huai'an District. It is 30 km long and covers an area of 30 km2 from the Yangzhuang Wucha estuary of the ancient canal to the ground

culvert in Huai'an District. The scenic area relies on the construction of an important central city in Huai'an and northern Jiangsu, continuously strengthening the construction of water conservancy infrastructure and tourism supporting facilities, constructing and repairing a large number of cultural landscapes, greatly improving the water environment of the ancient canal and the landscape level of the scenic area. In 2014, it was established as a national 4A level canal cultural corridor tourist attraction, and in 2016, it passed the national level water conservancy scenic area review, and continuously maintained and improved the ecological environment (Zhu, & He, 2019) (Chen , 2021). Its main cultural characteristics include:

(1) Hydrological Landscape: The ancient canal scenic zone has rich hydrological landscapes and a considerable scale, which combines many characteristics of the water culture of the Huaihe River and the canal culture, making it highly ornamental. Such as the Changhuai Ancient Ferry by the Grand Canal and the Hexia Ancient Town at the entrance of the ancient Han Gou into the Huai River. Here, there are outstanding people and numerous celebrities. During the Ming and Qing dynasties, there were 67 Jinshi here, with a profound cultural heritage.

(2)Cultural landscape: The ancient canal scenery belt has prominent cultural landscape characteristics, including famous scenic spots such as Zhongzhou Island and Lake Island Park Chuxiu Garden. Xiaohu Lake, Shaohu Lake and Yuehu Lake are located on the side of the canal in Huai'an District. They are the famous "Three Lakes Scenic Spot" in Huai'an Prefecture and the symbol of the historic and cultural city in Huai'an District. The scenic spot highlights the beautiful Natural landscape and profound cultural heritage, integrates the surrounding environment, combines the development of cultural tourism economy, and is positioned as a characteristic historical and cultural scenic spot integrating classical gardens, religious culture, celebrity culture, and green water culture in the ancient city of Huai'an.

(3)Tianxiang Landscape: The ancient canal has four distinct seasons, with rain, fog, frost, and snow, making it suitable for the four seasons.

(4) Biological landscape: ancient roses and natural ginkgo in Huai'an are rare "Living fossil".

(5) Project landscape: through the Control engineering and the north gate of Duitangzi Lane The joint regulation and control of the bridge Control engineering and the culvert gates along the line can realize the smooth, active, clear and waterscape of the Li Canal, and has multiple functions such as flood blocking, waterlogging drainage, ecological water replenishment, navigation, urban landscape and urban traffic.

3.4 Showcasing the spiritual symbols of the Dayun River culture in the Huai'an section

In history, Huai'an flourished in the canal and also declined in the canal. In recent years, the Huai'an Water Conservancy Department has conducted a thorough survey of water cultural relics. Qing Yan Garden, under the jurisdiction of Huai'an Water Resources Bureau, is a world heritage site of the Grand Canal, a landmark heritage area of intangible heritage, and a concentrated exhibition hall of "intangible heritage" of the Canal.

The name of Qing Yan Garden, which means "Heqing Huyan", is the court office of the riverway department of the governor general in the Qing Dynasty. From the 16th year of the Kangxi reign in the Qing Dynasty (1677) to the 10th year of the Xianfeng reign (1860) in 183, there were a total of 12 governors and 11 river governors, and 44 governors and 34 river governors stationed here. It is the only well preserved water conservancy management office garden at the governor level in the history of water management and transportation in China. The river governor who once stationed here, in response to the special geographical location and hydrological characteristics of Huai'an, as well as the requirements of multi-objective governance such as river management, Huaihe River diversion, and transportation, continued to carry out large-scale water conservancy project construction, making Huai'an the most densely populated and diverse area of water conservancy projects in the Qing Dynasty, and improving the management and application of water conservancy projects in the Qing Dynasty to an unprecedented level, This has led to a significant regional and contemporary engineering and management culture, leaving behind a large number of precious literature.

At present, there are three exhibition areas in Qing Yan Garden, namely, the Governor's Hall, the Southern Patrol Hall and the Water Conservancy Science and Technology Museum. According to the strict Hierarchy system of the Qing government, the Governor's Office, through a number of statues and

guards of honor, recreated the scene of the River Governor's office at that time. The museum focuses on the achievements of Chen Xuan, Wang Shu, Pan Jixun, Liu Daxia and others in the Ming Dynasty, as well as Jin Fu, Gao Bin, Gao Jin, Qi Sule, Lin Qing, Yengišan and Lin Zexu in the Qing Dynasty. The Science and Technology Museum mainly displays physical materials, relevant maps, and pictures of the river governor's water control. In order to solve the problems of sediment deposition in the Yellow River and the smooth passage of canal boats across the Yellow River and the Huaihe River, the Ming and Qing dynasties adopted such technical measures as "harnessing water to attack sediment", "storing clear water to brush the Yellow River", "avoiding the Yellow River and diverting water from the Huaihe River", and continued to build a series of buildings such as the Hongze Lake levee and the Shuqing Yuhuang Dam, which eventually formed the Qingkou Junction Project. In recent years, Qing Yan Garden has added a memorial hall for river governor, which is now open to the general public, adding a new card to the Huai'an Canal civilization. The memorial hall, taking the documents, memorials and Zhu Pi of the river governor as the main link, collects, distinguishes, duplicates and preserves the water conservancy documents written by the river governor in the Ming and Qing dynasties, the water conservancy memorials written by the river governor in the Qing dynasty and the emperor's Zhu Pi, and echoes these precious "intangible cultural heritage" treasures with the display contents of the Qing Yan Garden Governor Hall, the Science and Technology Museum and the Southern Tour Hall, clearly outlining the historical context of water conservancy governance in Huai'an in the Qing Dynasty, Fully showcase the water culture and history of Huai'an, and jointly enhance the display effect of the Governor General's River Department Office.

Conclusion

Since the application of the Grand Canal for World Heritage, research on the Grand Canal culture has been relatively popular in China, mainly focusing on conservation planning and linear theory research. By analyzing the morphological characteristics of the water cultural heritage in the Huai'an section of the Grand Canal, this paper explores the protection and inheritance strategies of the water cultural heritage in the Huai'an section of the Grand Canal. Different protection measures are implemented according to the characteristics of different canal cultural heritage, in order to promote the scientific protection and rational utilization of the water cultural heritage in the Huai'an section of the Grand Canal, and to provide Huai'an experience and create Huai'an models in promoting the construction of the Grand Canal cultural belt.

Conflict of Interest

The authors declare that they have no conflicts of interest to this work.

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