Research on Protective Development of Wetland Ecological Resources in Poyang Lake

Jianbo He¹, Zhen Wang²,*

¹School of Tourism, Jiangxi Science & Technology Normal University, Nanchang, China
²School of Foreign Languages, Jiangxi Science & Technology Normal University, Nanchang, China

*Corresponding author: Zhenwang@jxstnu.edu.cn

Abstract. As one of three major ecological regulatory systems in the world, wetlands play an important role in protection of ecological environment and biodiversity. As the largest freshwater lake in China, Poyang Lake is also one of the areas with the most abundant biological resources in wetland ecosystem in China, which has great ecological and economic benefits. In recent years, a string of problems inevitably exist in the further development of Poyang Lake wetland ecological resources. Based on comprehensive introduction of Poyang Lake wetland ecological resources, this paper makes a comprehensive analysis of its development and utilization status and existing problems. Besides, it also puts forward a series of strategies for protection and development of Poyang Lake wetland, in an effort to further protect ecological resources of Poyang Lake wetland and realize the sustainable utilization of resources.

1. Introduction

Wetland, which is widely distributed around the world, is an ecosystem with rich biodiversity and high productivity on earth. It is in the natural, artificial, permanent, temporary marsh, moorland, peat land or water zone. It can maintain waters of static, flowing, fresh water, brackish water, salt water, and water depth not more than 6m when in low tides. At present, there are 64 wetlands of international importance in China, among which the Poyang Lake National Nature Reserve in Jiangxi was listed in the List of Wetlands of International Importance in 1992. It is one of the earliest wetlands of international importance in China. Poyang Lake is rich in ecological resources and has a variety of state-level protected plants and animals. With its rich biological resources and powerful regulatory functions, Poyang Lake wetland plays an important role in protecting ecological safety and regulating and storing Yangtze River floods. However, in recent years, due to the overexploitation and other factors, wetland degradation, water area reduction and other problems come one after another. In order to solve the problem fundamentally, we must find the balance point between exploitation and protection. The key is to realize protective development.

2. Overview of Poyang Lake Wetland Ecological Resources

Poyang Lake is located in the north of Jiangxi Province, about 50 kilometers east of Nanchang city. Poyang Lake meets Ganjiang river, Xiuhe River, Xinjiang River, Raohe River and Fuhe River above,
and meets Yangtze River, the longest river in China below, with a total area of about 3,900 square kilometers.

Poyang Lake Ecological Wetland is one of six wetlands in the world, the largest wetland in Asia and the largest freshwater lake wetland in China. Poyang Lake wetland is mainly composed of lake water area, lake beach, bottomland and farmland along the lake. The bottomland of Poyang Lake takes up 80% of total area of Poyang Lake wetland and is the main landform of Poyang Lake wetland. The total area of Poyang Lake beach is about 3,130 square kilometers, which exceeds the total area of Dongting Lake and Taihu Lake. There are 41 islands in lake district, covering an area of 103 square kilometers and 1005 square kilometers of reclamation area along the lake. In the southwest of the lake is the typical wetland of Poyang Lake. This area belongs to the complex delta formed by Ganjiang River and Xiuhe river. In 1983, the 224-square-kilometer Poyang Lake Migratory Bird Reserve was established. In 1988, it was promoted to national nature reserve.

The plant of Poyang Lake covers a total area of about 2,600 square kilometers, accounting for 80.8% of the whole lake area, and its living biomass is 431.76×10^4t. Poyang Lake is located at the southern fringe of subtropical Asia, in the transition zone between tropical South Asia and subtropical Asia. It has excellent temperature and water resources, and the most diverse aquatic plant species. The total number of plant species in Poyang Lake is as high as 476, with various species. Abundant plant species, high plant cover area and combination of aquatic and terrestrial plants make Poyang Lake a unique wetland landscape.

Meanwhile, Poyang Lake has a wide range of animal species, with a total of about 800 species, including 14 species of first-class national wildlife protection and 48 species of second-class national wildlife protection. Among the many animal resources of Poyang Lake, the bird resources are the most representative.

Poyang Lake is the largest extant wintering ground for white cranes and the largest wintering colony of migratory birds found so far. Every year, tens of thousands of migratory birds from Mongolia, Japan, Russia, Siberia, North Korea and northern China migrate to Poyang Lake for habitat before gradually disappearing in the following spring. Every year, the white cranes that come to Poyang Lake in Jiangxi account for 98 percent of the total cranes in the world. There are 310 extant species of birds in Poyang Lake, which are classified according to their habitat. There are 3 species of straggler birds, 45 species of resident birds, 155 species of winter birds and 107 species of summer birds. Among them, there are mainly the white crane under the first class national protection and the white-naped crane under the second class national protection. In addition, there are also national first-class protection animals such as black stork, white stork and great bustard, and national second-class protection animals such as spotted beak pelican, white spoonbill, cygnet, white-fronted goose, black crown cuckoo hawk, kite, black-winged kite, black eagle, crested eagle, goshawk and blue-winged thrush.

3. Development and Utilization Status of Poyang Lake Wetland Ecological Resources

The main landform of Poyang Lake is lake wetland, which is rich in biological species and plays an important role in the protection of rare migratory birds, the maintenance of the ecological function of the Yangtze River estuary, and the protection of fish and finless porpoise. In recent years, due to long-term overdevelopment and utilization, lack of protection measures and other factors, the contradiction between economic development demand and environmental carrying capacity has been increasingly intensified, resulting in wetland degradation and lake beach reduction in Poyang Lake. It has seriously threatened the ecological security and sustainable development of Poyang Lake area.

3.1. Excessive Development and Exploitation

From the late 1950s to the mid-1980s, the forest landscape of the Poyang Lake Basin had been destroyed. Forests degenerated into sparse forests, thickets, or even wastelands where plants could not survive. In waters, in 1954, the area of Poyang Lake was 5,100 square kilometers, and now it has shrunk to 3,150 square kilometers. Excessive deforestation has severely damaged the forest landscape.
and the area of forest has been greatly reduced. A large amount of soil flows into the lake, and the sediment content of the river increases, forming a large area of swamp and lake beach, which affects the water area of Poyang Lake. Human production activities have led to the increase of fields and the continuous expansion of cultivated land has affected the original wetland area. The rise of industry, sewage discharge from many chemical plants, and the use of chemical fertilizers and pesticides have caused irreversible damage to the wetland resources of Poyang Lake and seriously affected the ecological environment of Poyang Lake.

3.2. Lack of Awareness of Environmental Protection in Tourists
In recent years, with people's awareness of environmental protection increasing, ecotourism has become a fashion crowd. While more and more tourists go into nature, they also pose a threat to the ecological environment to varying degrees, such as the environment pollution caused by excessive eating, living, travelling and traffic, the environmental damage behaviors caused by tourists lack of environmental awareness and so on. In addition, some managers, developers and local residents, in order to ensure income, ignore the environmental carrying capacity and accept excessive tourists in order to obtain higher benefits. These actions lead to serious damage to wetland ecotourism resources in Poyang Lake and even become a booster for wetland degradation and water loss.

3.3. Inadequate Legal Regulation
At present, there are not many regulations and regulations for Poyang Lake, and the local awareness of laws related to wetland protection is low. The lack of legal protection of wetlands leads to the weak and non-binding control of human activities locally, which results in the problems that wetland ecotourism resources are overexploited and environmental pollution is difficult to control. The insufficient decentralization of management also caused resistance to the implementation of the environmental protection measures of Poyang Lake wetland, and a situation in which instructions are difficult to implement emerges.

4. Strategies for Protective Development of Ecological Resources in Poyang Lake Wetland

4.1. Conversion of Cropland to Lake, Restoration and Protection at Same Time
First, adequate funding should be ensured. Whether it is state allocation or local allocation, the allocation of funds should be reasonable. Increasing the investment of restoration project is beneficial to the sustainable utilization of Poyang Lake wetland resources. Therefore, in addition to investment in development and construction, we should also pay attention to the investment in restoration projects in the allocation of funds. And the protection of resources is the basic requirement to realize the sustainable development of resources. Second, establish a protection management system. In order to restore and protect the ecological resources of Poyang Lake wetland, special departments and personnel should be set up to manage and inspect the ecological resources of Poyang Lake wetland regularly and supervise the scale of people's activities in Poyang Lake, which helps to monitor the repair process, prevent further damage, and ensure the stability of the repair works.

At present, returning farmland to lake is the main direction of Poyang Lake wetland restoration scheme, including stopping tillage, fishing and animal husbandry, constructing ecological engineering, helping to construct Poyang Lake ecological circle, in order to restore or approach the original natural environment. In the process of construction, we should also pay attention to combining the development needs of tourism industry and combining nature protection with sightseeing to create a natural ecological area where people live in harmony with nature. This not only ensures the health of Poyang Lake environment, but also makes full use of its wetland ecological resources to realize the sustainable development of resources.
4.2. Perfect Legislation to Give Wetland Protection a Legal Basis

First of all, local governments and management departments should be standardized, which can effectively urge local government departments to strengthen management, supervise local residents, and attach importance to the protection measures of Poyang Lake. Secondly, the behavior of enterprises and developers should be standardized, and the mandatory regulations can be used to control them to ensure their development and the rational development of ecological resources in Poyang Lake wetland. Finally, perfect the corresponding laws and regulations aiming at local residents and tourists. As for excessive reclamation and fishing by local residents, littering by tourists, environmental damage and other behaviors, these are supposed to be restricted in order to mitigate environmental damage due to human activities.

4.3. Strengthening Propaganda and Education to Raise Awareness of Environmental Protection

As one of the main forces of ecotourism, whether the tourists have a strong sense of environmental protection or not has great influence on the natural resources of the wetland landscape. According to its own ecological characteristics, Poyang Lake Region should formulate a set of propaganda and education system which belongs to itself to export the concept of green environmental protection to people. While reducing pollution damage, it also inculcates the idea of protecting the environment to local residents and tourists. The implementation of effective publicity and education on environmental protection in Poyang Lake can be carried out from the following aspects: first, enrich the content of the Propaganda and Education Hall in Poyang Lake Region. The Propaganda and Education Hall is the exhibition of propaganda and education, in which the word “propaganda and education” cannot be ignored. With the progress of science and technology, more updated high-tech means can be applied to display. With the help of these scientific and technological means, the exhibition can become more lively and improve the enthusiasm of tourists.

Second, raise environmental awareness among staff in the region. Adding environmental protection training to staff entry training, which makes staff understand the environmental protection clearly. Enhance staff's awareness of environmental protection by specifying environmental protection behavior requirements in employee guidelines and employee manuals. In the process of management, the management should supervise the behavior of the staff, point out and correct the environmental dereliction of duty of the staff. And they are excepted to establish the mechanism of environmental protection reward and punishment and link the interests of the staff with the environmental protection of Poyang Lake wetland, which increases the enthusiasm of the staff to protect the Poyang Lake wetland environment.

5. Conclusion

Poyang Lake wetland, one of the most important wetlands in the world, is rich in ecological resources and has various contents. And it plays an important role in regulating flood, regulating climate, purifying water quality, preserving species and providing wildlife habitat. In the process of developing ecological resources of Poyang Lake wetland, we should take protection as fundamental premise, take sustainable development as the maximum goal and emphasize utilization protection. Through a series of scientific methods, we can find the balance point between development and protection, step up efforts to the comprehensive management and protection of ecological environment, coordinate the harmonious development among wetland resources, lake ecological health and economy and society in the lake area, so as to realize sustainable development of ecological resources in Poyang Lake.

References
[1] Guo Jin. Research On Protection and Development of Wetland Eco-tourism Resources[J]. Vacation Tour, 2018(07).
[2] Yan Xin, Shen Shouyun. On Protection Status of Wetland Eco-system of China[J]. Modern Horticulture, 2014(07).
[3] Deng Donglai. On Construction and Development of Poyang Lake Wetland Park[J].
Technology Wind, 2019(22).

[4] Chen Jie. Analysis on Administration of Sustainable Development of Poyang Lake Wetland Protection[J]. Resources Economization & Environmental Protection, 2015(05).

[5] Fan Wenhu, Miao Tong. Literature Review of Protection and Utilization of Wetland Resources[J]. Journal of Library and Information Science, 2015(24).

[6] Hong Mengting. On Ecological Restoration and Tourism Development of Rural Wetland Park[J]. Agricultural Engineering, 2016(01).

[7] Liu Juan, Fu Yong. On Present Situation and Protective Measures of Wetland Resources of Poyang Lake[J]. Ability and Wisdom, 2009(10).

[8] Jin Weigen, Liao Xialin. Study On Wetland Eco-tourism of Poyang Lake[J]. Soils, 2008(01).