

STUDY ON WETLAND LOSS AND ITS REASONS IN CHINA

HE Yan¹, ZHANG Ming-xiang^{2,3}

(1. The Chinese Academy of Sciences, Beijing 100864, P. R. China; 2. Changchun Institute of Geography, the Chinese Academy of Sciences, Changchun 130021, P. R. China; 3. Wetland Resources Monitoring Center, State Forestry Administration, Beijing 100714, P. R. China)

ABSTRACT: Wetlands are ecosystems with many functions. But the general public and government lack a comprehensive understanding of the importance of wetland benefits, thus making blindly exploitation, wetland resources decreasing and losing biodiversity. So wetlands in China, as in most countries, have suffered heavily from the pressure of development and have confronted with the threats of loss. The paper takes Sanjiang Plain marshes, lakes in the middle reaches of the Changjiang (Yangtze) River, coastal wetlands and mangroves as cases to study wetland loss in China, and puts forward main existing reasons of wetland loss, such as blindly reclamation and exploitation of wetland resources, over-exploitation of bio-resources in wetland, etc. More recently, there has been a growing recognition of the benefits of wetlands and a wide range of legal and regulatory initiatives have been undertaken which are designed to improve wetland management and conservation. On the basis of the above analysis, the paper brings forward some suggestions on wetland conservation.

KEY WORDS: wetland resource; wetland loss; loss reason; China's wetland

CLC number: P941.78

Document code: A

Article ID: 1002-0063(2001)03-0241-05

1 INTRODUCTION

Wetlands are the ecosystems with many functions and have been providing us with a range of functions and benefits, such as water supply, flow regulation, sediment retention, moderation of climate, prevention of saline water intrusion, etc. Although wetland occupy only about 6% of the world surface, they may contribute up to 20% of the world's taxa and genetic resources, not including some unknown lives in wetland (MITSCH *et al.*, 1986). According to the definition of the *Convention on Wetlands of International Importance*

Especially as Waterfowl Habitat (Ramsar Convention), wetlands are defined as areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, blackish or salt, including areas of marine water within the depth no more than six meters at low tide. China's wetlands have an important status in the world. The total wetland areas of China is more than 65.94 million ha, accounting for about 10% of the world's wetland areas. Among them, natural wetlands is 25.94 million ha, being about 2.6% of China's surface (SFA, 2000). According to the statistics of State Forestry

Received date: 2000-12-26

Biography: HE Yan(1959 -), male, a native of Changchun City, Jilin Province, Professor. His research interests include wetland hydrology and hydrological environment.

Administration (SFA), the areas of natural wetlands in China, including marshes, lakes, coastal beaches and salt marshes, and areas of marine water the depth of which at low tide does not exceed 5 meters, are about 26 million ha (Table 1).

Table 1 The areas of natural wetlands in China (SFA, 2000)

Wetland types	Areas (million ha)
Marshes	11.97
Lakes	9.10
Beaches and salt marshes	2.17
Areas of marine water (0–5 m)*	2.70
Total	25.94

* Because the National Wetland Inventory is still being compiled and short of detailed data of areas of marine water within the depth no more than 6 meters at low tide.

2 CURRENT STATUS AND RECENT TRENDS OF WETLAND LOSS

For a long time, the general public lacks a comprehensive understanding of the various functions and values of wetlands, and does not have sufficient knowledge of the importance of wetland conservation. So, the wetlands in China have suffered heavily from the pressures of population growth and economic development, especially during the opening decade as the country struggled to control poverty and achieve food self-sufficiency.

Although there are limited historical data on which to base a nationwide authoritative estimate, there are quantitative data for certain specific areas which support the general view that wetland areas nationwide have been declining significantly. It is estimated that 40% (WANG, 1998) of existing important wetlands have been threatened by wetland degradation and loss. Especially in the latest 50 years, the wetland loss and degradation have developed very rapidly. There is the same situation in the world. The United States has lost some 87 million ha (54%) of its original wetlands, primarily to agricultural production (BARBIER *et al.*, 1997). Figures for wetland loss in six European coun-

tries are given in Table 2.

Table 2 Wetland loss in Europe (BARBIER, 1997)

Country	Period	Loss of wetlands (%)
Netherlands	1950–1985	55
France	1900–1993	67
Germany	1950–1985	57
Spain	1948–1990	60
Italy	1938–1984	66
Greece	1920–1991	63

3 WETLAND LOSS IN SOME IMPORTANT REGIONS IN CHINA

Among all the wetlands, the Sanjiang Plain marshes, lakes in the middle reaches of the Changjiang River, coastal wetlands in the East China, and mangroves in the South China Sea are the most important areas in the whole country in terms of wetland areas and biological significance. At present, the agricultural reclamation and urban development are the mainly reasons of wetland loss and degradation. Especially in the populous littoral areas and around lake areas, the wetland loss speed is 20 000 ha per year due to polder (SFA, 2000).

The Sanjiang Plain is one of the biggest wetland areas in China and is located in northeastern Heilongjiang Province, on the Sino-Russian border and at the junction of three rivers: the Heilong River, the Songhua River and the Wusuli River. The total area of Sanjiang Plain is about 11.59 million ha. Agricultural reclamation of Sanjiang Plain is the main reason of wetland loss and reduction of its ecological functions. The area of farmlands in 1949 was only 786 000ha and still was the vision of the Great Northern Wilderness in that time. Since the 1950s the beginning of large-scale reclamation, about 3 000 000ha wetlands have become farmlands. Till 1995, the farmland has already reached 3 668 000ha, up to 466.7% of that of 1949 (LIU, 1997), thus making wetland area decrease rapidly (Table 3).

Table 3 The changes of the farmland area
in Sanjiang Plain(LIU, 1997)

Year	Total ($\times 10^3$ ha)	Areas of farmlands ($\times 10^3$ ha)		Compared with 1949(%)
		County	Stated-owned farms	
1949	786	779	7	100.0
1952	911	872	39	116.0
1959	1253	957	296	159.4
1965	1457	900	557	185.4
1975	2048	1030	1018	260.7
1983	3526	2008	1518	448.6
1995	3668			466.7

In the middle reaches of the Changjiang River, the unplanned exploitation has led to the shrinking of wetlands and substantially reduced area of water. The combined effect of siltation and reclamation from 1949 to the present time has reduced the total surface area of lakes in the middle reaches of Changjiang River by nearly 60% (from 25 825km² to 10493km²) (YU, 1999). In the latest 60 years, in Jiang-Han Plain reclamation has filled up 6000km² of the water surface of lakes, and the lake areas has decreased from 8 330km² to 2608km². The number of lake decreased from 1 052 in the early 1950s to 309 nowadays (CAI *et al.*, 1995). The area of Dongting Lake was reduced from 4206km² to 1502.7km² (Table 4).

Table 4 The changes of areas of lakes in the middle
reaches of Changjiang River(km²)(YU, 1999)

Period	Dongting Lake	Jiangnan Lakes	Four-Lakes region
1920s - 1930s	4206	8330	
1950s	4009	5960	2030
1970s	2507.87	2373	
1980s	2146.9	2983	844
1990s	1502.7	2608	707.34

Coastal wetlands have been the most affected of all wetlands, mainly due to reclamation for urban/industrial or agricultural purposes. It is estimated that, between 1950 and the late 1980s, about 50% of all coastal wetlands (over 2×10^6 ha) were reclaimed of which about 1×10^6 ha was reclaimed for urban/indus-

trial development and 1.19×10^6 ha was reclaimed for rural development purposes and salt production (SFA, 2000).

Mangrove ecosystems have also been significantly reduced by more than half from about 40 000ha in 1957 to about 18 800ha in the mid-1980s (ZHENG *et al.*, 1996), mainly due to aquiculture developments, reclamation, over-logging etc. In Hainan Province only 2000ha of 8000ha of mangrove remained. In Fujian Province almost all mangrove disappeared (SCOTT, 1989).

4 MAJOR THREATS OF WETLAND DEGRADATION AND LOSS

It is estimated that 40% of current wetlands are being under various threats to degradation and loss in China. Each threat differs in area and in trends (Table 5). The main threats are as follows: land reclamation, over-exploitation of bio-resources, pollution, exploitation of water resources and hydro-engineering, siltation, coastal erosion, urban development and tourism (SFA, 2000; WANG, 1998).

Most of the threats listed in Table 5 still influence the wetlands. It is not optimal to reverse the trend of wetland loss in the near future although wetland reclamation is confined as the policy of lake restoration from farmland has been declared by central government. There still remain many threats to wetlands from uncontrolled land reclamation, particularly those sponsored by lower levels of government whose main objectives are local food security and promotion of economic development at almost any cost.

5 CONCLUSION AND SUGGESTION

Since the UN Conference on Environment and Development, and China's accession to *the Ramsar Convention and Convention on Biological Diversity*, especially in 1998 the catastrophic floods happened in the middle and lower reaches of the Changjiang River, the

Table 5 Major threats and recent trends of wetland degradation and loss in China

Main causes	Acting regions	Consequences	Trend
Wetland reclamation	Densely populated littoral area, middle Changjiang River, Sanjiang Plain	Wetland loss & function degradation	Before 1980s: agricultural reclamation 1980s – 1990s: aquaculture future: slowly stopped
Over-exploitation of bio-resources	Lakes, reservoirs, littoral area, mangrove*	Decline in biodiversity and wetland function, destruction of habitats	Bio-resources have been and will be still degraded
Pollution	All wetlands, especially economically developed areas	Decline in water quality, biodiversity, and capacity of purification; increase in pollutants to wetlands	The threats are remarkable and will be upgraded in terms of extensity and intensity
Exploitation of water resources & hydro-engineering	Northwest China, North China, big river watershed	Decrease or depletion of water resources, habitation and function degradation	The threats will be exist for long time. The situation will be worse in Northwest and North China
Siltation	Lakes, reservoirs, river courses, especially in central and eastern parts of China	Wetland degradation and loss; decline in capacity of flood retention	Situation has been aggravated
Coastal erosion	Littoral area, especially coastline of East China Sea and South China Sea	Coastal wetland loss	Not alleviated
Urban development & tourism	Lower reaches of the Changjiang River, the Zhujiang River Delta, southeastern littoral area	Fragmentation and isolation of wetland, alteration of habitats	Urban development is still executing threats to wetland degradation. The threats from tourism development to wetland are increasing

* Especially the logging, poaching, bird trap, egg collection, fish capture by means of trapping, exploding, draining, poisoning etc.

Nenjiang River and the Songhua River, the Chinese Government has been paying great attention to ecological and environmental construction. The reclamation to lakes and marshes has been controlled and wetland restoration and creation plan has been implemented in the middle and lower reaches of the Changjiang River. The man-made decrease of wetland areas has been kept within limits, but the exploitation of the coastal wetlands, such as beaches, does not take any effective measures. Along with the establishment of natural reserves and reinforcement of their management, wetland conservation will be better. But as a whole, it is difficult to reverse the impetus of wetland degradation and

loss recently.

In order to effectively manage and conserve wetlands in China, here are some suggestions on policies and approaches.

1) To improve the law, institution and policy systems for the wetland use, conservation, and restoration. In order to increase the capacity of the implementation of *the Ramsar Convention*, it is necessary to formulate the complete law system on wetland conservation and management and to promote the local government legislation. It is also important to enforce the wetland conservation institutions, to clarify and adjust the departmental policies which are unmatched with the wet-

land conservation and management.

2) To improve the management of wetland natural reserves. According to the current wetland degradation and loss status, it is necessary to establish some new wetland natural reserves in different eco-regions, especially in the riverhead and upper reaches of the Changjiang River and the Huanghe(Yellow) River, flood plains, water source area and mangroves.

3) To promote the implementation of *China Wetland Conservation Action Plan*. According to *China Wetland Conservation Action Plan*, it is very important to improve the wetland management systems, to carry out the research, monitoring and demonstration, to establish and improve national wetland monitoring system. It is necessary to set the wetland conservation and restoration as the priorities in *National Eco-Environment Construction Plan* to ensure enough financial support.

4) To strengthen the Environmental Impact Assessment (EIA). Without the necessary EIA, some agricultural development, urban construction and other activities will cause negative impacts on wetland environment and result in wetland degradation. So, in order to meet the need of the government and the public, we should strengthen the EIA.

5) To enforce the propaganda, education and international cooperation on wetland preservation and restoration.

REFERENCES

- BARBIER EDWARD B *et al.*, 1997. *Economic Valuation of Wetlands*[M]. Gland, Switzerland. 10 – 11.
- CAI Shu-ming, ZHANG Xiao-yang, 1995. Study on wetland and its dynamic changes in Jiangnan Plain using remote sensing [A]. In: *Study of Wetland in China*[C]. Changchun: Jilin Science and Technology Press, 177 – 181. (in Chinese)
- LIU Xing-tu, 1997. Wetland resources and its sustainable use in Songnen-Sanjiang Plain[J]. *Scientia Geographica Sinica*, 17 (Supp.): 451 – 460. (in Chinese)
- MITSCH W J, GOSSELINK J G, 1986. *Wetland*[M]. New York: Van Nostrand, 536.
- SCOTT D, 1989. *Directory of Asian Wetland*[M]. Gland, Switzerland. IUCN Publication.
- SFA(State Forestry Administration), 2000. *China National Wetlands Conservation Action Plan*[M]. Beijing: China Forestry Publishing House, 1 – 25. (in Chinese)
- WANG Yan-hui, 1998. Wetlands in China are confronting threats of degradation and loss[N]. *China Green Times*, 1998-02-09. (in Chinese)
- YU Guo-ying, 1999. Wetland ecosystem management and floods in the Changjiang River Basin in 1998[A]. In: *Proceedings of Sino-Canadian Seminar on Wetland Protection and Conservation*[C]. 25 – 30.
- ZHENG De-zhang *et al.*, 1996. The utilization, protection and expand of mangrove wetland[A]. In: *Wise Use and Conservation of Wetland in China*[C]. Beijing: China Forestry Publishing House, 209 – 215. (in Chinese)