

On the Management and Legislation of Mangrove Natural Reserves in China

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Abstract: Mangroves refer to the forested land in the mangrove wetland, and are only part of the ecosystem of the mangrove wetland. As mangroves and mangrove wetlands are two distinct entities, the practices of protecting them should accordingly take into consideration their unique features. However, in China, mangroves are classified as simply “forest”, thus the Mangrove Protection Laws and Regulations, which are far from sufficient, are drafted and implemented by the government’s forestry department/division. As a result, mangroves are managed and protected in the same way as forest land. Ignoring the integrity of the wetland ecosystem is another obstacle to protecting mangroves in China. The typical approach to protecting mangroves in China is “nursing only the woods”, rather than the ecosystem as a whole. To make matters worse, there is no special agency to coordinate the authorities under different departments, such as the forestry department, marine department, and the other departments that oversee the mangroves in some way. As a result, it is very difficult to avoid juridical conflicts among various departments. This paper provides some suggestions on the management and legislation of mangrove natural reserves in China. Firstly, non-governmental monitoring mechanisms should be incorporated into the management and protection of mangrove wetlands. Secondly, we need to improve public participation and to protect the ecological interest actively. Thirdly, each mangrove natural reserve should have its own regulations in order to protect mangroves more effectively.

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I . Introduction

In recent years, a large number of mangroves in the Hainan Dong-zhai-gang National natural reserve have withered and died. More and more mangroves in the Reserve have been succumbing to the same fate. The situation breaks local residents' hearts. "Why don't we cherish the mangroves endowed by nature, while reclaiming green land from the sea?" The local residents who have strong ecological consciousness appealed to the news media.^① On the global scale, mangrove areas are becoming smaller or fragmented and their long-term survival is at great risk.^②

Mangrove species in China belong to the Indo-Malaysia Northeast subgroup of East group and covered >50000 hectares in the 1950s.^③ Currently there are 23 families and 81 species of mangroves in the world, and 39.5% of them can be found in Hainan. The Hainan Dong-zhai-gang Mangrove National natural reserve is located in northeastern Hainan Province (19°51'~20°01'N, 110°32'~110°55'E). Established in 1980, it was the first mangrove natural reserve in China. In 1986 it was upgraded to the status of national natural reserve, and in 1992 enrolled in the *Convention on Wetlands of International Importance Especially as Waterfowl Habitat*. However, sacrificed for economic development, Dong-zhai-gang has been negatively affected by over-fishing, mudflat aquaculture, duck breeding, and engineering construction in recent years. In the past 50 years, nearly 50% mangrove forests have been destroyed.

The Hainan Dong-zhai-gang Mangrove National Natural Reserve is not the only one that faces problems in managing its wetlands. Through the surveys and research in the Jiu-long River Estuary Mangrove Natural Reserve in Fujian, Shenzhen Futian Mangrove Reserve in Guangdong, and Shankou Man-

① Yuan Lan and Liu Sunmou, Sorrow! Many Mangroves Wither to Die in Dong Zhai-gang, *Southern Metropolis Daily*, 13 August 2010 (04).

② N. C. Duke, J. — O. Meynecke, S. Dittmann, A. M. Ellison, K. Anger, U. Berger, S. Cannicci, K. Diele, K. C. Ewel, C. D. Field, N. Koedam, S. Y. Lee, C. Marchand, I. Nordhaus, and F. Dahdouh-Guebas, A world without mangroves?, *Science*, Vol. 317, 2007, pp. 41~42.

③ Wang Wenqing and Wang Mao, *The Mangroves of China*, Beijing: Science Press, 2007, p. 143.

groves National Natural Reserve in Guangxi, as well as other reserves in China, we have found that the management and legislation of mangrove natural reserves in China have been outstripped by recent economic development, which has adversely affected mangrove protection and conservation.

One of the main causes of these consequences is that people, especially policymakers, in China fail to understand “mangroves” compose only a part of “mangrove wetlands” and we should focus on the integrity of the whole ecosystem to adequately protect mangrove wetlands. It is necessary for the government to adopt new policies that take into account mangrove protection in addition to coastal economic development. On this account, the paper aims/intends to state clearly the problems related to the management and legislation governing mangrove protection and to propose some feasible suggestions.

II . Problems on the Management and Legislation of Mangrove Natural Reserves in China

A. Problems in Managing Mangrove Natural Reserves in China

In the 1960s, to answer the call “get food from the sea”, a large sea area was hastily reclaimed as land in southern China. That was the first time that mangroves suffered large-scale damage. Since the 1980s, a great number of newly built fishponds in mangrove areas delivered a second deadly blow. In 1990, mangroves surrounding some cities suffered damage once again due to urbanization, coastal industrial development, and transport infrastructures.^① For instance, the increasingly busy waterway transportation threatens mangroves with waves produced by ships, especially speed boats. The speed boats destroy the roots of mangroves as they zip by, and this will eventually kill the mangroves. Roughly 100 speed boats per day pass by the Jiu-long River Estuary Natural Reserve, and the speed of these boats averages 30—40 km/h. Scouring out the mudflat of mangroves day after day leads to the destruction/devastation of large expanses of mangroves, and the integrity of seawalls has also been compromised by these speed boats. Similar problems also exist in the Hainan Dong-zhai-gang Natural Reserve, but the situation has been improved in recent years by replacing motorboats with man-powered ships.

① Wang Wenqing and Wang Mao, *The Mangroves of China*, Beijing: Science Press, 2007, pp. 145~146, p. 153.

Investigation of mangrove resources in China, published by the State Forestry Bureau in 2001, estimates that Chinese mangroves cover some 22,000 hectares, the majority of which is located in protected areas. Mangroves are now well protected, and direct, large-scale damage has been reduced in recent years. Even so, in the long run, the prospect of mangrove protection in China fraught with challenges/difficulties. ^①

Due to the lack of scientific theory to guide the practice, mangrove protection in China is still at an exploratory stage. For example, mangroves are classified as “forest”. Laws and regulations on mangrove protection are enacted by the Ministry of Forest and are far from adequate. More often than not, the standards of forest land are adopted and followed in managing and protecting the mangrove wetlands. More importantly, the definition of mangroves in China does not encompass the whole of the mangrove wetland ecosystem.

Compared with terrestrial forests, mangroves possess many more characteristics of marine organisms. “Mangrove” is a term used in forestry that, strictly speaking, refers to the forested land of a mangrove wetland. This forested portion constitutes only part of the greater/entire mangrove wetland. At present, many people mistakenly consider mangroves and mangrove wetlands to be one and the same. In China, it is the former that is being primarily studied and protected. The failure to have a clear concept has led to confusion in the practice of protecting mangroves and mangrove wetlands. As a result, many people, including the staff working in mangrove natural reserves, are unaware of how to distinguish between mangroves and mangrove wetlands.

The main problem in protecting mangroves in China is that the holistic integrity of the wetland ecosystem has been ignored. The method of conserving mangroves in most mangrove reserves of China remains still at the level of “nursing the woods”. ^② This misunderstanding is caused in part by the tendency to blur together the two concepts of mangroves and mangrove wetlands, and also by the unawareness of the basic and integral structure of mangrove wetlands. Protection in some areas even does not include inter-tidal zones and shallow waters. For instance, in the Shenzhen Futian Mangrove Reserve, the forested land remained stable under the protection regime of the 1990s, but the ecosystem has deteriorated quickly due to an onslaught of urban sprawling and

① State Forestry Administration, *Investigation of mangrove resources in China*, 2002.

② Wang Wenqing and Wang Mao, *The Mangroves of China*, Beijing: Science Press, 2007, p. 145, p. 165.

construction of boscaiges and fishponds. Most of the affected sites are areas where birds used to forage and build nests. The highest diversity index and density of ostards dropped by 19% and 39.1%, respectively, and the number of the ardeidaes fell by nearly 70%, because the sites subject to destruction used to be places where birds forage and have other activities.^① Similar things have happened all over China's mangrove natural reserves.

Mangrove wetlands are an integral and indivisible ecosystem. It is not enough to merely protect the forested land alone. How would the entire ecosystem be best protected? The approach should be attuned to the nature of mangrove wetland itself.

Moreover, constructing standard seawalls along the inner edge of mangroves in middle inter-tidal zones, cutting off the flourishing mangroves, stops the sea and the land from exchanging substances, energy, and information. This practice accelerates the extinction of mangroves. Since there are few feasible laws and regulations to follow, establishing natural reserves with the capacity to make their own regulations is a solution to protect mangroves in China. Ever since 1975 when the Hong Kong Mipu Mangrove Wetland was named as a natural reserve and in 1980 when the Dong-Zhai-gang provincial mangrove natural reserve was established, the protection of mangroves in China has been improving gradually. Until now, China has set up 20 natural reserves for mangrove protection, including six national ones, five provincial ones, and nine city-level ones. The total protection area amounts to about 65,000 hectares, of which 16,500 hectares are areas of mangroves. They represent 74.8% of China's mangroves.

Table 1 Mangrove Natural Reserves in China^②

Name of protected zone	Location	Area (hm ²)	Area of man-groves (hm ²)	Level	Year of establishment	Authority
Hainan Dong-zhai-gang National Natural Reserve	Haikou Hainan	3337	1733	National	1980(p) 1986(n)	Forestry

① WANG Yongjun, ZAN Qijie and CHANG Hong, *The Community Ecology of Herons (Ardeidae) in Futian Mangrove Wetland, Shenzhen*, *Acta Scientiarum Naturalium Universitatis Sunyasei*, Vol. 38, No. 2, 1999, pp. 85~89.

② Wang Wenqing and Wang Mao, *The Mangroves of China*, Beijing: Science Press, 2007, p. 163.

Renewal table 1

Name of protected zone	Location	Area (hm ²)	Area of man-groves (hm ²)	Level	Year of establishment	Authority
Shenzhen Futian Mangrove Reserve (part of Guangdong Nei-Ling-Ding & Futian Natural Reserve)	Shenzhen Guangdong	304	82	National	1988	Forestry
Guangxi Shankou National Natural Reserve	Hepu Guangxi	8000	806.2	National	1990	Marine
Guangdong Zhanjiang National Natural Reserve	Zhanjiang Guangdong	20278.8	7256.5	National	1997	Forestry
Guangxi Beilun Estuary National Natural Reserve	Fangchenggang Guangxi	2680	1131.3	National	2000	Marine
Fujian Zhang River Estuary National Natural Reserve	Yunxiao Fujian	2360	83.3	Provincial National	1997(p) 2003(n)	Forestry
Hainan Qing lan Provincial Natural Reserve	Wenchang Hainan	2948	1223.3	Provincial	1988/1981	Forestry
Fujian Jiu long River Estuary Provincial Natural Reserve	Longhai Fujian	600	297.3	Provincial	1988	Forestry
Fujian Quan zhou wan Estuary Provincial Natural Reserve	Quanzhou Fujian	7039	17	Provincial	2003	Forestry
Guangdong Zhuhai Qi-ao & Dan-gan Island Natural Reserve	Zhuhai Guangdong	7363	193.3	Provincial	2002	Forestry
Guangxi Qinzhou Mao-wei-hai Mangrove Natural Reserve	Qinzhou Guangxi	2784	1892.7	Provincial	2005	Forestry
Hainan Zhanzhou Dong-chang Mangrove Natural Reserve	Zhanzhou Hainan	696	478.4	City-level	1986	Forestry
Hainan Chengmai Hua-chang-wan Mangrove Natural Reserve	Chengmai Hainan	150	150	City-level	1995	Forestry
Hainan Zhanzhou Xinying Mangrove Natural Reserve	Zhanzhou Hainan	115	79.1	City-level	1992	Forestry
Hainan Lingao Caihong Mangrove Natural Reserve	Lingao Hainan	350	85.8	City-level	1986	Forestry
Hainan Sanya mangrove Natural Reserve	Sanya Hainan	923.7	59.7	City-level	1989	Forestry
Guangdong Dian-bai-xian Mangrove Natural Reserve	Diaobai Guangdong	1905	150.9	City-level	1999	Forestry
Guangdong Maoming Dong-wan Mangrove Natural Reserve	Maoming Guangdong	1999	607	City-level	1999	Forestry

Renewal table 2

Name of protected zone	Location	Area (hm ²)	Area of man-groves (hm ²)	Level	Year of establishment	Authority
Guangdong Huizhou Huidong Mangrove Natural Reserve	Huidong Guangdong	533.3	136	City-level	2000	Forestry
Guangdong Enping Zhen-hai-wan Mangrove Natural Reserve	Enping Guangdong	666.7	134.3	City-level	2005	Forestry
	Total	65032.5	16579.1			

From the table, we can see that there are 17 mangrove natural reserves, which means that 14509.6 hm² of the total area 54202.5 hm² are under the control of the Ministry of Forestry in China. There are three zones under the government of marine sector, an area of 10830.0 hm² with the area of mangroves being 2087.5 hm². Which organ, the Ministry of Forestry or the National Bureau of Oceanography, should be in charge of governing and protecting mangrove wetlands? This dilemma has yet to be resolved, and this uncertainty has substantively hindered the protection of mangrove wetland ecosystems.

In addition, the problems on the personnel administration of Chinese mangrove protection have directly influenced the outcome of the management. The shortage of the infrastructure keeps the mangrove protection in Dong-zhai-gang far from an effective one. The lack of technical strength of the managers in most mangrove natural reserves in China is one of the bottlenecks for the development of Chinese mangrove protection.

B. Problems on the Legislation of Mangrove Protection in China

Article 3 of the *Law of the People's Republic of China on the Management of Sea Areas Use* provides that, "The sea areas shall belong to the State, and the State Council shall exercise ownership over the sea areas on behalf of the State." It can be understood to mean that all sea areas should be governed by the local branch of the National Bureau of Oceanography on behalf of the State. As we know, the coastal wetland, in which the mangroves grow, is located between the land and the sea areas. As such, it contains land, sea-water, animals, plants, and other natural resources. It is unclear who wields the power and responsibility to manage and protect mangroves on the coastal wetlands. Is it the National Bureau of Oceanography, or the Ministry of Forestry, or the lo-

cal village-level committee? There is no answer to be found in current Chinese laws.

Nowadays, the management of the coastal wetland resources in China takes place in accordance with the types of resources. Different departments govern different resources, and all of them protect the mangroves on the basis of their own specialties. In practice, this managing system grants overseeing capacity over the mangrove wetlands to several departments, such as the Ministry of Forestry, National Bureau of Oceanography, Ministry of Environmental Protection, Ministry of Agriculture, Ministry of Land and Resources, Ministry of Maritime, Ministry of Fishery, Ministry of Water Resources, Ministry of Housing and Urban-Rural Development, and Ministry of Transport, among others. There is no single agency tasked with coordinating cooperation or resolving conflicts among the above-mentioned departments; as a result, the conflicts of jurisdiction among various sectors are difficult to avoid.

During our investigations over the past year, we were told that the inefficient management practice has plagued efforts to protect mangroves. The ambiguous ownership of the mangrove forestry land and mudflats leads to confusion on many fronts, ultimately leading to various difficulties concerning mangrove protection and the development of natural reserves. The problem of uncertainty over land ownership also affects mangrove natural reserves in China.

The protection that Chinese legal system provides for the comprehensive and systemic management of the mangrove wetlands is limited. There are over 20 laws and regulations on the protection of mangrove wetlands, including the *Constitution of the People's Republic of China*, *Law of the People's Republic of China on Environmental Protection Law*, *Law of the People's Republic of China on Forests*, *Law of the People's Republic of China on Land Administration*, *Law of the People's Republic of China on the Protection of Wildlife*, *Law of the People's Republic of China on Prevention and Control of Water Pollution*, *Law of the People's Republic of China on Water*, *Law of the People's Republic of China on Water and Soil Conservation*, *Law of the People's Republic of China on Fishery*, and *Law of the People's Republic of China on Marine Environment Protection*, among others. These laws address the authority relationships among departments managing resources, the use and protection of resources, and the legal liabilities for damage to resources and so on. The *Convention on Biological Diversity* and *Convention on Wetlands of International Importance Especially as Waterfowl Habitat* may also be considered legal sources since China has acceded to these international conven-

tions.

On the regional level, some coastal provinces have formulated their own management rules. Guangdong province has issued the *Forestry and Wildlife Type Natural Reserve Management Rules of Guangdong Province*. Guangxi province has formulated the *Forestry and Wildlife Type Natural Reserve Management Rules of Guangxi Zhuang Autonomous Region* and *Shankou Mangrove Ecosystem Natural Reserve Management Measures of Guangxi Zhuang Autonomous Region*. Hainan province in turn has enacted/adopted the *Forestry Protection Management Regulations of Hainan Province* and *Mangrove Protection Rules of Hainan Province*, the latter representing the first piece of provincial legislation on mangrove protection in China. However, the above-mentioned laws only address their local mangroves, and there are still an abundance of legal gaps and conflicts. Take the Jiu-long River Estuary Mangrove Natural Reserve for example: There is no special legislation for the protection of mangroves in Fujian province, so other laws and regulations are used instead, such as the *Coastal Protection Forests Regulations of Fujian Province* (1995), *Preventive Treatments and Ecological Protection Measures of Jiu-long River of Fujian Province* (2001) and *Marine Environment Protection Rules of Fujian Province* (2003). These laws and regulations only contain a few scattered articles touching on the mangrove ecosystem. Moreover, some articles can only be used, after a fashion, by analogical interpretation, and naturally, different government departments often interpret the relevant articles differently. Laws without feasible articles to follow — that is the unfortunate situation of the management of the Jiu-long River Mangrove Natural Reserve.

The Wetland Protection Regulations of the People's Republic of China, which was drafted by the State Forestry Bureau of China, was adopted in the conference of State Forestry Bureau on Oct. 20, 2008. It was then proposed to the Legal Affairs Office of the State Council of China, seeking the opinions of relevant departments.^① However, the legal status/force of the regulations is much weaker than that of the *Law of the People's Republic of China on Forests* or other laws. What is more, the law on mangrove wetlands protection has its own special objectives, purposes, and basic principles, so it cannot be encompassed by the other resource laws or pollution prevention laws. The laws con-

① Liu Weiping, Yuan Yunqiu, Zhang Jianhua and Zhou Dongliang, *The Investigation and Thinking on the Legislation of Wetland Protection*, *Wetland Science and Management*, No. 1, 2006, pp. 26~32.

cerning various kinds of resources aim at the protection of said resources and do not specifically target wetland ecosystems. Such laws cannot meet the requirement of managing the mangrove ecosystem by means of Integrated Ecosystem Management, and cannot reflect the ecological value of mangrove wetlands, either.

A full understanding of the structure and function of the mangrove wetland ecosystem, as well as the sentiments of the communities that surround the mangroves, should be the basis of future legislation since the mangroves within coastal wetlands are different from ordinary trees. The water of a mangrove wetland is not ordinary water, either. The laws and regulations on mangrove protection should be much more specific and comprehensive.

III. Suggestions on Management and Legislation of Mangrove natural reserves in China

A. Non-governmental Monitoring Mechanisms should be Utilized in the Management and Protection of Mangroves

The lack of mechanisms to monitor the management of mangrove protection strips the laws and regulations of mangrove management of any real vitality/efficacy. A company needs a board of directors/trustees to supervise the executive organization. Similarly, monitoring mechanisms should be utilized in the management of mangrove natural reserves.

Both the supervisory authority and management authority for mangrove protection are functional departments of the government, which are closely related and even share the same higher authorities. Under the circumstances, we wonder whether the supervisory authority for mangrove protection can play an important role in the monitoring or not. If there is no effective supervisory mechanism in place (which would better enable the actions of officials to be reviewed by higher authorities and civilians), the management authorities of mangrove natural reserves, as a subsidiary organ of government functions, would be powerless to stop the actions of the local government pursuing economic development at the expense of destroyed mangroves.

Let's take the Jiu-long River Estuary Mangrove Natural Protection Zone as an example. In 1997, the city government of Longhai in Fujian province invested some 25 million RMB to reclaim 6900 acres of mudflats in Zini Town in order to develop a fish breeding industry and to gain more real property. The

project, listed by the municipal government as one of important projects that “Do Practical Things that Benefit Local Residents,” conferred many benefits for little investment, by reclaiming 6900 acres of mud flat to develop aquaculture and increase land area. However, 490 acres of mangroves and large expanses of suitable land for more mangroves were inside the area reclaimed. Some experts and scholars, like Professor Lin Peng (a member of the Chinese Academy of Sciences and professor at Xiamen University), unequivocally opposed the act, since it would destroy large expanses of mangrove wetlands. Lin Peng reported the situation to the appropriate authorities. Fujian Provincial Environmental Protection Bureau and Fujian Provincial Forestry Department accepted the suggestions from the experts and scholars, and consequently in September 1998, the Planning Commission of Fujian Province published the official documents stating that the project would be abandoned. The related departments eventually realized the importance of mangrove protection. Hypothetically, if there had been no such supervisory mechanism available, then there would have been no opportunity for experts and scholars to express their concerns and the mangroves would have suffered a massive loss. It is thus vital to involve non-government organizations in the oversight mechanisms of wetlands management. Furthermore, the involvement of non-governmental supervisory mechanisms in the management and protection of mangroves also enables the government to make decisions democratically.

B. Improve Public Participating Mechanism to Protect the Ecological Interests Actively

Without an effective public participating mechanism, the management of mangrove wetlands protection is by no means complete. For various reasons, the awareness of the public in China regarding mangrove protection is still insufficient. Although to an extent the public supports protecting mangroves, public participation is minimal and the scope of participation very limited. This disconnect hinders the development of the mangrove wetland protection.

In concert with the nascent policy referred to as “little government, big society” and the increasing enthusiasm of the public to protect mangrove wetlands, it is high time to enhance the mechanism for public participation. The public should be granted the right to know in environment (RKE) and to participate in the formulation of legislation that deals with mangrove protection. Besides, by drawing civilians’ attention, we can supervise the departments in

charge of mangrove wetland protection more effectively.

Mangrove wetlands serve two major interests for human beings; one is an ecological interest, namely its usefulness to people as an intact ecosystem; the other is economic interest, or the financial benefit provided to people living near the mangrove wetlands. It should be made explicit in China's legislations that we protect the ecological interest for our people. Only in this way can the public turn to judicial relief to protect mangrove wetlands from suffering ecological damage. In the meantime, people whose livelihood depends on a healthy mangrove ecosystem would doubtless suffer great economic loss if the mangrove wetlands are destroyed.

A scientific regime should be developed for the exploitation and utilization of mangrove wetlands to protect the ecological interests in the coastal wetlands. A wetland protection law is required to institutionalize such contents, and to guide the lower-level regulations.

Nowadays, the public lacks full awareness of the importance of mangrove wetlands. It is imperative to make citizens fully aware of the wetlands' vital ecological and economic role. The public should act not only as consumers of mangrove wetland resources but also as stewards. The importance of a dynamic public participating mechanism has already been realized and adopted by several countries, such as America, Japan and Germany. It can be said that to a large extent, the overall effectiveness of mangrove wetland protection measures is contingent upon the level of public participation.

C. Each Natural Reserve Should Have Its Own Regulations on Mangrove Natural Reserve

China is a vast country with complex landforms, various climates, abundant resources, and a large population. It is therefore necessary that fundamental issues be regulated by national laws and regulations. Yet in a nation so vast and diverse, oftentimes within national laws there are no specific laws attuned to the unique features of various regions.^① For this reason, each natural reserve should be able to enact its own regulations for the management and protection of mangroves under its jurisdiction.

Firstly, such an autonomous legislative method should have clear and dis-

① Jin Ruilin and Wang Jin, *The Study of Certain Problems of Chinese Environment and Natural Resources Legislation*, Beijing: Peking University Press, 1999, p. 18.

tinct legislative standards, and all regional or local laws enacted should be consistent with the spirit of “the Constitution” and “Legislation Law”. Secondly, this approach should have greater flexibility and must address each mangrove natural reserve individually because of the wide-reaching and complex character of the wetlands ecosystem. Thirdly, the legislation mode should be completely feasible and beneficial to mangrove protection.

As we know, there are mangroves in many provinces and areas in China, including Hainan, Guangdong, Guangxi, Fujian, Zhejiang, Hong Kong, Macao, and Taiwan. Geographic, economic, and social conditions differ significantly from one province to another. Environmental and resource management policies should be developed with each area’s unique circumstances in mind. The places that have better environmental conditions or richer resources may have more hands-off policies, while places with less ideal conditions should have more stringent ones. Such realities may affect environmental and resource-management legislation. It is prudent to adopt specific management measures suitable to each mangrove natural reserve, and prepare a specific management mechanism for each mangrove natural reserve. It must be stressed that the regulations that a natural reserve promulgates for itself should be guided by the department that originally approved the establishment of the reserve.

IV. Conclusion

In future scientific and other studies, it is necessary to differentiate between mangroves and mangrove wetlands. It is vital for us to modify the traditional management system and to apply integrated ecosystem management to better protect mangrove wetlands. Legislative activities should be launched as soon as possible. An official agency in charge of both the development and conservation of mangroves should be established.

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