Implementing the Strategic Action Programme for the South China Sea and Gulf of Thailand (SCS SAP Project)

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ACHIEVEMENTS IN IMPLEMENTING THE STRATEGIC ACTION PROGRAMME IN CHINA DURING 2008-2021

Achievements in Implementing the Strategic Action Programme in China during 2008-2021

INTRODUCTION

Recognizing that actions were urgently needed to halt degradation of the environment of this marine basin, the countries of the region sought the assistance of UNEP and the Global Environment Facility (GEF) in preparing a Transboundary Diagnostic Analysis of the issues and problems and their societal root causes as the basis for development of a Strategic Action Programme (SAP). The up-dated Strategic Action Programme was one of the anticipated outputs from the UNEP/GEF Project entitled "*Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand*" (SCS Project), and the document contains the final text as approved by all countries during the 8th meeting of the Project Steering Committee in Hanoi, Viet Nam, August 2008. It was anticipated that the countries would commence implementation of the envisaged actions in 2008/2009 in parallel with the process in seeking further support from GEF for the SAP implementation.

The SAP established a series of objectives and priority costed actions for coastal habitats, land-based pollution management, and the over-exploitation of fish stocks in the South China Sea. In order to implement the SAP, at the regional level, the GEF adopted on November 03, 2016 the project entitled "*Implementing the Strategic Action Programme for the South China Sea and Gulf of Thailand (SCS SAP Project)*". It was noted that regional actions would contribute to achieving the target through: capacity building for activities at the national and local levels; provision of opportunities in exchange of experiences and good practices among countries in the region; common guidelines and other tools used by countries in management planning and practices; standardisation in regional synthesis and comparison; provision of sound scientific information for management; and encouraging governments at all levels to develop policy related to environment management. It was also emphasised that actions at the national and local levels are critical for success of the SAP targets. National Action Plans (NAPs) were developed in all participating countries and had been, or would be adopted by, governments to meet national priorities and to contribute to regional targets incorporated in the SAP.

As other participating countries, China developed the NAPs for habitat and land-based pollution management during the course of the SCS Project and have conducted a series of activities in implementing the SAP and NAPs since 2008. This evaluation provides evidence on proactive contribution of China in implementing the SAP and NAPs on mangroves, coral reefs, seagrass and coastal wetlands and supports to estimate country co-finance for environment management in the SCS during last decade. The reviews of past activities and outputs would be helpful for seeking the gaps which shall be addressed in implementing the SCS-SAP project in 2022-2023.

EVALUATION OF ACHIEVEMENTS

1/ Mangroves

SAP Targets and Summary of Achievements

The Strategic Action Programme targets for mangroves in China focus on improving the management of mangrove areas for the sustainable use of mangrove resources and protection of mangrove ecosystems. The main tasks focus: 1) improving regulations and policies for sustainable mangrove management and protection, and implement a strict mangrove protection regime. 2) implementing mangrove planting and restoration projects in demonstration sites. 3) strengthening mangrove biodiversity protection. 4)

establishing a performance evaluation mechanism for mangrove protection in demonstration sites. 5) strengthening capacity building and public involvement in mangrove protection. Five SAP target sites included: Shangkou, Qinglangang, Dongzhaigang, Futien and Fangchenggang. With the efforts from national level and international supports, there existed many activities in not only SAP target sites but also in others for implementing the SAP in last years since 2008 with numerous outputs which are summarized in table 1 below.

Table 1. Summary of the SAP targets for mangroves and achievements during 2008-2021 in China

Regional Output	SAP 2008 targets (ha)	Achievements (ha) during 2008-2021					
		Shankou	Dong-zhaigang	Futian	Qing-langang	Fang-chenggang	Total
1.1.1 Declaration of 57,400 ha of mangrove as National Parks and Protected Areas	5,330	800	1,700	80	1,400	1,300	5.280
1.1.2 Designation and plans for the management of 166,600 ha of mangrove as non-conversion, sustainable use areas	NA	NA	NA	NA	NA	NA	NA
1.1.3 Reform of laws and regulations for the sustainable use of 602,800 ha of mangrove forest		800	1,700	80	1,400	1,300	5,280
1.1.4 Replanting of 21,000 ha of deforested mangrove land	500	2.8	315	NA	103	260	680.8
1.1.5 Biodiversity increased for 11,200 ha of mangrove forest via enrichment planting	5,000	9.47	301	NA	NA	200	502,5
1.1.6 Monitoring of management effectiveness		800	1,700	80	1,400	1,300	5,280

Descriptions

1.1.1 Declaration of 57,400 ha of mangrove as National Parks and Protected Areas

All mangrove target sites of China were declared as National or Provincial Nature Reserves in the decade of 1980-1990. Among them some were listed in the Ramsar Convention on Wetlands as internationally important wetland (Shankou -1990, Dongzhaigang – 1992, Fangchengang - 2008)

1.1.1.1 Shankou

Shankou site is located in Guangxi Shankou Mangrove National Nature Reserve, which was established in 1990. The nature reserve covers an area of 8,000 ha, including 836 ha of mangrove forest. In 2001, this reserve was listed in the Ramsar Convention on Wetlands as internationally important wetland.

1.1.1.2 Dongzhaigang

Dongzhaigang site is located in Hainan Dongzhaigang National Nature Reserve at the junction of Haikou city and Wenchang city in the north-eastern Hainan Island. The nature reserve is established in 1980,

covering an area of 3,337.6 ha, including 1,771 ha of mangrove forest[1]. In 1992, this reserve was listed in the Ramsar Convention on Wetlands as internationally important wetland.

1.1.1.3 Futian

Futian site is located in Shenzhen Neilingding Futian National Nature Reserve, in the northeast of Shenzhen Bay. Established in 1984, the nature reserve consists of two areas, one of which is Futian site, covering an area of about 368 ha[2], including about 80 ha of mangrove forest[3].

1.1.1.4 Qinglangang

Qinglangang site is located in Hainan Qinglan Mangrove Provincial Nature Reserve, in the north-eastern Hainan Island. Established in 1981, the nature reserve covers an area of about 2,915 ha, including 1,444 ha of mangrove forest[4].

1.1.1.5 Fangchengang

Fangchenggang site is located in Guangxi Beilun River Mouth Mangrove National Nature Reserve. Established in 1983, the nature reserve covers an area of 3,000 ha[5], including about 1,300 ha of mangrove forest[6]. In 2008, this reserve was listed in the Ramsar Convention on Wetlands as internationally important wetland.

1.1.2 Designation and plans for the management of 166,600 ha of mangrove as non-conversion, sustainable use areas

[Name and area (ha) of each mangrove site under management plan for sustainable use. Indicate status in mapping, site characterizations and management plan endorsement for priority mangrove sites]

No information available for this target

1.1.3 Reform of laws and regulations for the sustainable use of 602,800 ha of mangrove forest

1.1.3.1 Shankou

There are about 836 ha of mangrove forests in the site. In 2018, Guangxi Zhuang Autonomous Region People's Government promulgated Guangxi Zhuang Autonomous Region Shankou Mangrove Nature Reserve and Beilun River Mouth National Nature Reserve Management Measures, which strengthened sustainable management in site.

1.1.3.2 Dongzhaigang

There are about 1,771 ha of mangrove forests in the site. The Standing Committee of the People's Congress of Hainan Province promulgated the Regulations on the Protection of Mangrove Forests in Hainan Province in 1998, and revised it in 2020. In 2014, The People's Congress Standing Committee of Haikou City issued “Decision on Strengthening Protection and Management of Mangrove Wetlands in Dongzhaigang ”. These regulations strengthens sustainable management in site. The actions for continuously enhanced pollution control were conducted at the site in recent years. Firstly, the nature reserve together with Meilan District

1 the Master Plan of Hainan Dongzhaigang National Nature Reserve (2018-2027)
2 Marine Environment Status Bulletin of Shenzhen in 2017
3 Neilingding Futian Nature Reserve official Wechat platform.
4 Notice on the work plan of returning ponds to forests and wetlands in Hainan Qinglan mangrove Provincial Nature Reserve by Wenchang Municipal People's Government, Aug. 2017
5 People's Daily, June 2, 2022
6 People's Daily, June 2, 2022

Government and local community remedied some sources of pollution in the upstream of the river, and managed farming activities. Secondly, Hainan Mangrove Tourism Co. bought villagers' diesel boats to eliminate pollution from the boats. As a result, water quality in site improved significantly.

1.1.3.3 Futian

There are about 80 ha of mangrove forests in the site. In 2012, Shenzhen issued Regulation on the Management of Shenzhen Neilingding Futian National Nature Reserve, which strengthened sustainable management in site.

Practice on nature education: The Mangrove Foundation (MCF) cooperates with the Futian District Education Bureau, the Futian District Science and Technology Association, and the Protected Area Administration to carry out the "Futian District Primary and Secondary School Students' Mangrove Science Education Activity Project", which is open to reservations for schools in Futian District every month. In the Futian Mangrove Ecological Park, activities such as "Shenzhen Bay's Little Key", and "Thursday Fixed-point Bird Watching" are carried out, and "Visit Bird Paradise" and "Explore Tide" are carried out in the Mangrove Reserve. These promote awareness of coastal wetland protection, and develop a group of supporters for coastal wetland protection. Thousands of activities have been held to directly serve more than 200,000 people, including primary and secondary school students.

Restoration of Fishponds for bird habitats: Enclosure fishponds provide high-tide level habitats for birds and have a positive effect on bird protection. The enclosure fish ponds in Futian Mangrove Reserve covered an area of about 66.67 hectares, accounting for 18% of the total area. However, the water is too deep so that it cannot meet the habitat needs of different birds. By learning from the fish pond management experience in the Hong Kong Mai Po Reserve, the Guangdong Neilingding Futian National Nature Reserve Management Bureau cooperated with the Mangrove Foundation (MCF) to take actions to meet the needs of different water bird habitats. The part of fish ponds was remedied, turning the artificially farmed fish pond into a habitat for birds. The fishpond restoration area formed a mosaic pattern of deep water, shallow water and middle island. And reed communities were planted on the embankment to meet the needs of different water birds. In addition, to further create a suitable habitat for water birds, in summer, the water level of the middle island is controlled to be above 0.3 meters, and the middle island is completely submerged to prevent the growth of plants on the gentle slope; in winter, the water level of the middle island is controlled at 0.0 to 0.1 meters, forming the middle island and tidal flat for water bird.

1.1.3.4 Qinglangang

There are about 1,444 ha of mangrove forests in the site. The Standing Committee of the People's Congress of Hainan Province promulgated the Regulation on the Protection of Mangrove Forests in Hainan Province in 1998, and revised it in 2020, which strengthened sustainable management in site.

1.1.3.5 Fangchenggang

There are about 1,300 ha of mangrove forests in the site. In 2018, Guangxi Zhuang Autonomous Region People's Government promulgated Guangxi Zhuang Autonomous Region Shankou Mangrove Nature Reserve and Beilun River Mouth National Nature Reserve Management Measures, which strengthened sustainable management in site.

1.1.4 Replanting of 21,000 ha of deforested mangrove land

Name of sites	Replanting area (ha)	Period
Shankou	2.8	2008-2021
Dongzhaigang	315	2013-2022

Qinglangang	103	2018-2020
Fangchenggang	260	2016-2019

1.1.5 Biodiversity increased for 11,200 ha of mangrove forest via enrichment planting

The table below provides information on increased biodiversity, considering ecological and environmental indicators at enrichment planting sites, including: forest cover; number and diversity of true mangrove species; and size and abundance of Scylla spp and Sesarma spp]

Name	Area of sites (ha)	Area of enrichment planting（ha）	Period	Information on increased biodiversity
Shankou	8,000	9.47	2008-2021	Increased macrobenthos density and biomass. Species of insects in the site increased from 301 in 2009 to 452 in 2019.
Dongzhaigang	3,337.6	301	2013-2022	The number of Marine benthic animals and microorganisms increased.
Fangchenggang	3,000	200	2016-2019	Bird species increased, from 187 species at the beginning of the establishment to 299 species in 2021. Macrobenthos density increased.

1.1.6 Monitoring of management effectiveness

1.1.6.1 Shankou

Guangxi Shankou Mangrove National Nature Reserve covers an area of 8,000 ha, including 836 ha of mangrove forest. The site has established a relatively complete monitoring management mechanism.

Firstly, the nature reserve is one of the national typical marine ecosystem monitoring areas. Monitoring work is carried out annually according to the national routine marine ecological environment monitoring plan. Monitoring indicators include mangrove species and area, water quality, plankton species, benthic species, intertidal benthos species, invasive plant and so on. Monitoring evaluation is published in Bulletin on China's Marine Ecological Environment. Monitoring evaluation shows that mangrove ecosystem in site was healthy during 2008-2021.

Secondly, the monitoring work as internationally important wetlands is carried out in the site according to the National Standard on Important Wetland Monitoring Indicator System (GB／T 27648--20 11). Monitoring indicators concern water quality, wetland plants and vegetation, birds, alien species, impact of human activities, and so on. Monitoring evaluation is published in Ecological Status of China's Internationally Important Wetlands.

Thirdly, the Ten-Year evaluation on the Shankou Mangrove Reserve was carried out in response to UNESCO World Biosphere Reserve evaluation programme. Assessment indicators concern resident income, industrial structure, number of employments, mangrove area and biodiversity and so on. The first evaluation was conducted in 2010.

Fourthly, the nature reserve has conducted annual routine monitoring on mangrove ecosystem since 2006. Monitoring indicators include distribution of mangrove communities, species and area, bird, benthic species, water quality, sediment, alien species, insect pest, and so on.

Available data indicated that mangrove density, macrobenthos density and biomass in site is an increase over last year, according to 2021 Bulletin on China's Marine Ecological Environment. The annual routine monitoring on mangrove ecosystem shows that mangrove area increased, and the number of birds increased with stable species during 2008-2019.

1.1.6.2 Dongzhaigang

Hainan Dongzhaigang National Nature Reserve covers an area of 3,337.6ha, including 1,771 ha of mangrove forest. The site has established a relatively complete monitoring management mechanism.

Firstly, the National Forestry and Grassland Administration has built a national observation and research station to monitor and research on the site's mangrove ecosystem in 2004. Monitoring indicators concern hydrology, meteorology, biodiversity, soil and so on.

Secondly, as internationally important wetlands, the site is monitored and surveyed according to the National Standard on Important Wetland Monitoring indicator System(GB／T 27648--20 11). Monitoring indicators concern water quality, wetland plants and vegetation, birds, alien species, impact of human activities, and so on. Monitoring evaluation is published in Ecological Status of China's Internationally Important Wetlands.

The area of mangroves in the reserve was expanding year by year. The variety and quantity of wild animals and plants was increasing. The number of Marine benthic animals and microorganisms increased. The water quality of the nature reserve was improved to Class III, comply with the marine functional area requirement.

1.1.6.3 Qinglangang

Local government has conducted water quality routine monitoring in the nature reserve every year since 2015.

1.1.6.4 Futian

The Futian mangrove part of Neilingding Futian National Nature Reserve covers an area of 368 ha, including about 80 ha of mangrove forest. The site established a monitoring mechanism. The nature reserve entrusts the relevant organization to carry out comprehensive monitoring of the ecological status of the reserve annually since 2005. Monitoring indicators concern water quality, plants, plankton, macrobenthos, insects, birds and so on[7]. According to monitoring results in 2019, compared with the historical data, the species diversity of macrobenthos in the site was improved.

1.1.6.5 Fangchenggang

Guangxi Beilun River Mouth Mangrove National Nature Reserve covers an area of 3,000 ha, including 1,300 ha of mangrove forest. The site has established a relatively complete monitoring management mechanism.

Firstly, the nature reserve is one of the national typical marine ecosystem monitoring areas. The monitoring work is carried out annually in the area according to the national routine marine ecological environment monitoring plan. Monitoring indicators include mangrove species and area, water quality, plankton species, benthic species, intertidal benthos species, alien species and so on. Monitoring results published in Bulletin

7 ZHENG Zi-qiong, TANG Yi-Jie, et.al. Diversity of Macrobenthos in Futian Mangroves, Shenzhen[J] Wetland Science & Management, 2020,16(03):69-73.

on China's Marine Ecological Environment. According to the monitoring evaluation, mangrove ecosystem in site was healthy during 2008-2021, except for the year 2010 and 2012.

Secondly, the National Forestry and Grassland Administration conducted a coastal wetland resources special investigation demonstration project in the site, which finished in 2020. Monitoring indicators concern wetland natural geographical environment, wetland vegetation, wetland animals, wetland protection and utilization, status and so on. The result shows that mangrove ecosystem in site was generally healthy, mangrove community was stable, the number of benthic species was rich, and the wetland quality was generally good.

Thirdly, as internationally important wetlands, the site is monitored and surveyed according to the National Standard on Important Wetland Monitoring indicator System(GB／T 27648--20 11). Monitoring indicators concern water quality, wetland plants and vegetation, birds, alien species, impact of human activities, and so on. Monitoring evaluation is published in Ecological Status of China's Internationally Important Wetlands.

Available data indicated habitat improvement at the site. Firstly, bird species increased, from 187 species at the beginning of the establishment of the nature reserve to 299 species in 2021. Secondly, according to Bulletin on China's Marine Ecological Environment, mangrove density and macrobenthos density increased significantly over last years.

2/ Coral reefs

Targets and Summary of Achievements

China did not participate on coral reef sub-component in the South China Sea Project, 2002-2008. Therefore, there was no targets for coral reefs of China in the SAP. However, China has been attached importance to coral reef conservation. Some efforts have been conducted for coral reef management in China in last dozen years. Firstly, laws and regulations related to reef conservations have been established and improved. More than 10 of national laws and regulations have set clear legal articles on reef conservation[8][9][10], which include prohibiting the human activities from direct destruction of coral reefs, such as exploiting of corals, as well as protecting the marine ecological environment, such as the conservation of coral reefs and mangroves; In addition, the Fisheries Law of the People's Republic of China bans the use of prohibited fishing tools and measures that destroy fishery resources and habitats. The Environmental Protection Law of the People's Republic of China stipulates that the discharge of land-based pollutants into the sea shall strictly be conducted in compliance with the standards and regulations of the national and local governments. In 2021, stony corals, giant clams, the giant triton snail (*Charonia tritonis*), and other reef animals such as sea turtles and the humphead wrasse (*Cheilinus undulatus*) were included in the List of State-Protected Wildlife under State Priority Conservation to prohibits exploitation of them. Secondly, nature reserves for coral reefs conservation have been established. Thirdly, seasonal fishery closures have been implemented to continuously recover fishery resources. Fourthly, China has carried out the removal of crown-of-thorns starfish[2]. The last but not the least, China has established coral reef ecological monitoring zones to strengthen monitoring and management of coral reefs.

8 Status of Coral Reefs of China 2019

9 Sun Youfang, Huang Lintao, Mccook Laurence J, Huang Hui. Joint protection of a crucial reef ecosystem [Letter]. Science, 2022, 377: 1163

10 Tang Yi, Yang Haoran, Zhang Yanxuedan. Conservation of coral reef systems under Convention on Biological Diversity: China’s performance and suggestions. Biodiversity Science, 2022, 30, 21262.

The good examples of achievements in coral reef conservation at the site level are seen in the following three zones: Sanya, Weizhou and Xuwen. Table 2 below highlight achievements of the national activities in implementing the SAP during 2008-2021 in these 3 coral reef areas.

Table 2. Summary of achievements in coral reef management during 2008-2021 in China

Sites	Managed in 2008 (ha)	Total area (ha) * managed until 2021	Capacity	Management approach (ha)	Management Tools (ha)	Moni-toring (ha)
Sanya	NA	4,000	High	4,000	4,000	4,000
Weizhou	NA	2,512.9	medium	2,512.9	2,512.9	2,512.9
Xuwen	NA	14,378	medium	14,378	14,378	14,378
Total		20,890.9		20,890.9	20,890.9	20,890.9

* Area (ha) under sustainable management with sufficient capacity, approach reformed, tools applied and stress reduced; total area under management = managed in 2008 + added for management during 2008-2021

Descriptions

1.2. 110,430 ha of coral reef at 46 priority sites managed sustainably

The Sanya site is the Sanya Coral Reef National Nature Reserve[11], which is located in the ecological monitoring area of Hainan East Coast. The area covers 4,000 hectares.

The Weizhou Island site is Weizhou Island Coral Reef National Marine Park, which was established in 2012 with adoption of the State Oceanic Administration. The area covers 2,512.9 hectares, is mainly located in the northeast and southwest parts of Weizhou Island.

The Xunwen site is the Xuwen Coral Reef National Nature Reserve, which is located in the Southwest Coast of Leizhou Peninsula, Guangdong Province. Xuwen Coral Reef National Nature Reserve covers a total area of 14,378 hectares[12].

1.2.1 Management capacity (number/levels human resources, facilities and equipment, and sustainable financing mechanisms) built for 46 coral reef sites

1.2.1 Sanya

The Hainan authority established the Sanya Hainan Coral Reef National Nature Reserve Management Office, which is responsible for the protection and management of the reserve. It consists of an administrative section, a scientific research and education section, a supervision and enforcement section. The office established the scientific research advisory committee and three coral reef protection stations. At present, the reserve has a total of 28 staff. In 2022, the general public budget appropriated 15,444,000 yuan of revenue[13]. It has a coral reef ecological restoration research base (400 square meters), and a coral reef Protection Youth volunteer base in Hainan Province. It is equipped with two Chinese fishery law enforcement vessels, two Chinese maritime surveillance patrol law enforcement speedboats, three law enforcement management vehicles. The reserve set up 38 boundary markers, indicative signs, and had a series of coral survey monitoring and coral cultivation related equipment. These facilities and hardware

11 Yongqi LI et al., regional oceanography of China seas-marine environmental ecology, science press, 2012
12 Yongqi LI et al., regional oceanography of China seas-marine environmental ecology, science press, 2012
13 2022 Hainan Forestry Administration department budget disclosure table
https://www.hainan.gov.cn/hainan/czyjs/202202/3a448750093a4dbd97debf0a6e159166.shtml

provide a fundamental guarantee for the coral reef and its ecological protection and management in Sanya Coral Reef National Nature Reserve[14].

1,2,2 Weizhou

Weizhou Island Coral Reef National Marine Park, Guangxi Province is located in the southern seas, Beiihai Guangxi. In 2013, Beihai authority established the administration station on Weizhou Island Coral Reef National Marine Park, which is responsible for the daily management, scientific monitoring, ecological restoration and public education. The Station is currently under the jurisdiction of Beihai Oceanic Bureau, with four personnel in charge of the daily management, scientific research monitoring, ecological restoration and popular science education of the Park. The annual unit budget of the Park from 2021 to 2022 is between 660,000 yuan and 800,000 yuan[1516]. In 2015, the park received about 29 million yuan of national special funds for conservation of island and adjacent sea area, The fund support coral reef research base establishment, monitoring equipment procurement, and coral reef ecological restoration demonstration project[17]. In addition, the Coral reef National Marine Park has established a good cooperative relationship with Guangxi University, Guangxi Mangrove Research Center and other scientific research institutions.

1.2.3 Xuwen

"Guangdong Xuwen Coral Reef National Nature Reserve Administration" was established in 2007 with 9 staff. The administration consists of the administrative office, environment and resource office, and technology and science office. The administration has patrol boats and visual monitoring system, and coral science popularization office. In recent years, the administration cooperated with relevant colleges and research institutions to carry out coral reef survey, water quality monitoring and coral reef restoration. The reserve's annual unit budget from 2021 to 2022 is between 4.3 and 4.6 million yuan[18].

1.2.2 Management approaches and policy, legal & institutional reforms (integrated, community-based, multiple use) improved at 46 coral reef sites

1.2.2.1 Sanya

The Sanya site is the Sanya Coral Reef National Nature Reserve. Hainan authority has constantly improved local legal regulations and management regime related to coral reefs. Firstly, The Sanya Coral Reef National Nature Reserve with the goal of coral reef conservation have been designated, which are managed in accordance with the Regulations on National Nature Reserves and the Regulations of Hainan Province on Nature Reserves (Revised in 2018). Secondly, Specific Regulations were enacted, such as the Regulations on the Protection of Coral Reefs of Hainan Province (revised in 2009), the Regulations on the Protection of Coral Reefs and Tridacna of Hainan Province (implemented in 2017). Thirdly, the Plan for the prevention and control of marine pollution has been formulated and implemented to improve the water quality of habitat environment. For example, building the sewage treatment plant and pipe network in Sanya City, controlling pollution from marine aquaculture in Sanya City to improve the environmental quality of Sanya Coral Reef Nature Reserve. Fourthly, creating effectiveness management regime. The Sanya reserve creatively put forward the "government management, the enterprises involvement" Marine nature reserve management to form the reserve management and local economic development win-win mode. In addition,

14 Master Plan for Sanya Coral Reef National Nature Reserve, Hainan, 2020-2028 Submitted for approval (draft for Public comment), 2019, Sanya National Coral Reef Nature Reserve Management Office
15 Notice of the Office of Beihai Municipal People's Government on Printing and Distributing the Provisions on the Main Functions and Responsibilities of the Beihai Ocean and Fishery Bureau and the Establishment of the Personnel (BeiHai.gov.cn)
16 Beihai Marine ecological environment protection "14th Five-Year plan" Beihai City People's Government
17 Video of Weizhou Island Coral Reef National Marine Park in Guangxi(qq.com)
18 2022 budget of Guangdong Xuwen Coral Reef National Nature Reserve Administration

community co-management mechanisms have been established to study sustainable alternative livelihoods in order to relieve pressure on protected areas from residents living near[19].

1.2.2.2 Weizhou

The Weizhou sites is the Weizhou Island Coral Reef National Marine Park. Guangxi authority has constantly improved its local legal regulations, policies and measures for coral reef protection. Firstly, Guangxi authority enacted the Regulations of Guangxi Zhuang Autonomous Region on Wetland Protection (implemented in 2015), and the Regulations of Guangxi Zhuang Autonomous Region on Marine Environment Protection (revised in 2018), which stipulate the requirements for coral reef ecological protection. Secondly, Beihai authority enacted the Regulations on Ecological and Environmental Protection of Beihai Weizhou Island (implemented in 2018) to further strengthen coral reef protection. Thirdly, Guangxi authority formulated and implemented the plan for the prevention and control of coastal zone pollution to improve the quality of habitat environment.

1.2.2.3 Xuwen

The Xuwen site is the Xuwen Coral Reef National Nature Reserve. Guangdong authority has constantly improved its local legal regulations and policies for coral reef protection. Firstly, it enacted the Regulations of Guangdong Province on Wetland Protection (implemented in 2015), and the Measures of Guangdong Province on the Implementation of the Marine Environmental Protection Law of the People's Republic of China (revised in 2018), which stipulate the requirements for coral reef ecological protection. Secondly, Guangdong authority formulated and implemented the plan for the prevention and control of coastal zone pollution to improve the quality of habitat environment.

1.2.3 Management tools (licensing and permit systems, seasonal closures, zoning) developed and utilized to address key threats at priority sites

1.2.3.1 Sanya

The Sanya site is the Sanya Coral Reef National Nature Reserve. Hainan Authority has taken management tools such as nature reserve, ecological red lines and marine function zoning (spatial planning) for coral reef conservation. In addition, management measures such as seasonal fishery closures have been taken to further protect coral reefs. Firstly, Sanya Coral Reef National Nature Reserve[20], established in 1990, is located in Sanya, Hainan Province. The reserve covers an area of 8500 hectares and contains 118 species of reef-building corals[21]. Secondly, Hainan authority enacted the Regulations of Hainan Province on the Red Line for Ecological Protection and issued the scheme of Hainan Province Marine Ecological Red Line Delineation. Marine coral reef reserves and areas with coral reefs concentrated distribution have been designated to the ecological red line zone [3]. Thirdly, Hainan has formulated the Marine functional zoning. The stony corals concentrated distribution areas such as the primary area of Wenchang City and Sanya City were designated as Marine conservation areas. At the same time, the tourism and leisure area, agriculture fishery area that involves coral reefs and seagrass have more strict environmental protection requirements.

1.2.3.2 Weizhou

19 Wu Rui, Ding Xiangyu, Wang Daoru. Biodiversity conservation in Sanya Coral Reef National Nature Reserve[J]. Marine development and management, 2013, 11: 76-78

20 Master Plan for Sanya Coral Reef National Nature Reserve, Hainan, 2020-2028 Submitted for approval (draft for Public comment)

21 2020 Bulletin on the State of China's Marine Ecological Environment

The Weizhou sites is the Weizhou Island Coral Reef National Marine Park. Guangxi Authority has taken management tools such as marine nature reserves, ecological redlines and marine function zoning (spatial planning) for coral reef conservation. In addition, management measures such as seasonal fishery closures have been taken to further protect coral reefs. Firstly, the Weizhou Island Coral Reef National Marine Park has been established. Secondly, the scheme of Guangxi Marine Ecological Red Line Delineation was issued in 2017. The coral reefs concentrated areas are include in the marine ecological redline zone. Thirdly, the Marine function zoning of Guangxi Zhuang Autonomous Region has been formulated, and the east and southwest of Weizhou Island were designated as Marine conservation areas to protect coral reefs and their habitats.

1.2.3.3 Xuwen

The Xuwen site is in the Xuwen Coral Reef National Nature Reserve. Guangdong authority has taken management tools of marine nature reserves, ecological redlines and Marine function zoning (spatial planning) for coral reef consevation. In addition, management measures such as seasonal fishery closures have been taken to further protect coral reefs. Firstly, Xuwen Coral Reef National Nature Reserve and Leizhou rare aquatic life (white butterfly shell) provincial Nature Reserve have been established. Secondly, the scheme of Guangdong Province Marine Ecological Red Line Delineation was issued in 2017. The coral reef reserves and coral concentration areas are included into the ecological red line zone. Thirdly, Guangdong Province has formulated Marine functional zoning, and coral reefs concentrated areas, such as Xuwen Coral Reef National Nature Reserve of Zhanjiang City and Jiapeng Islands of Zhuhai City have been designated to Marine conservation areas to protect coral reef ecosystems and habitats.

1.2.4 Established mechanism for monitoring coral reef management

1.2.4.1 Sanya

The Sanya Coral Reef National Nature Reserve is located in the ecological monitoring area of the eastern coast of Hainan Province, which is the national key ecological monitoring area. In this area, a better monitoring mechanism has been established. From 2008 to 2021, according to the national routine marine ecological environment monitoring plan, the Coral reef ecological monitoring area of the eastern coast of Hainan Province is monitored annually. The monitoring indicators include coral species, live coral cover and coral mortality, etc.; water environment, sedimentary environment, fish tissue contaminants, etc.. Generally, monitoring frequency is once a year during April to September for the reef building coral community, three times for other indicators of seawater environmental quality. The evaluation contents include coral reef ecosystem health status, the analysis of its inter-annual variation trend, and the stress factors, etc. The monitoring and evaluation results are released in the Bulletin of China's Marine Environmental Quality[22].

Habitat improvement information: The 2020 Bulletin on the State of China's Marine Ecological Environment showed that the coral reef ecosystems are in a healthy state. The live coral cover of the east coast of Hainan was 18.0%, which was significantly higher than that of 5 years ago. The live coral cover of the east coast of Hainan increased compared with 2015. The 2021 Bulletin on the Status of China's Marine Ecology and Environment[23] pointed out that the number of live coral species and coral reef fish in the east coast of Hainan increased significantly compared with the previous year.

1.2.4.2 Weizhou

22 2018 Bulletin on the State of China's Marine Ecological Environment
23 2021 Bulletin on the State of China's Marine Ecological Environment

The Weizhou Island Coral Reef National Marine Park is located in the Beihai ecological monitoring area of Guangxi Region, which is the national key ecological monitoring area. In this area, a better monitoring mechanism has been established. From 2008 to 2021, the state had carried out monitoring of coral reef ecosystem health in the area. According to the national routine marine ecological environment monitoring plan, the Coral reef ecological monitoring area of Guangxi Beihai is monitored annually. The monitoring indicators include coral species, live coral cover and coral mortality, etc.; water environment, sedimentary environment, fish tissue contaminants, etc. Generally, monitoring frequency is once a year during April to September for the reef building coral community, three times for other indicators of seawater environmental quality. The evaluation contents include coral reef ecosystem health status, the analysis of its inter-annual variation trend, and the stress factors, etc. The monitoring and evaluation results are released in the Bulletin of China's Marine Environmental Quality.

Habitat improvement information: The 2020 Bulletin on the State of China's Marine Ecological Environment states that the coral reef ecosystem is in a healthy state. Compared with 2015, the number of live coral species increased in this area.

1.2.4.3 Xuwen

The Xuwen Coral Reef National Nature Reserve is located in the ecological monitoring area of the Southwest Coast of Leizhou Peninsula, which is the national key ecological monitoring area. In this area, a better monitoring mechanism has been established. From 2008 to 2021, the state had carried out monitoring of coral reef ecosystem health in the area. According to the national routine marine ecological environment monitoring plan, the Coral reef ecological monitoring area of the Southwest Coast of Leizhou Peninsula is monitored annually. The monitoring indicators include coral species, live coral cover and coral mortality, etc.; water environment, sedimentary environment, fish tissue contaminants, etc. Generally, monitoring frequency is once a year during April to September for the reef building coral community, three times for other indicators of seawater environmental quality. The evaluation contents include coral reef ecosystem health status, the analysis of its inter-annual variation trend, and the stress factors, etc. The monitoring and evaluation results are released in the Bulletin of China's Marine Environmental Quality.

Habitat improvement information: The 2020 Bulletin on the State of China's Marine Ecological Environment pointed out that the coral reef ecosystems are in a healthy state. Compared with 2015, the number of living coral species in the southwest coast of Leizhou Peninsula was basically stable. The 2021 Bulletin on the Status of China's Marine Ecology and Environment pointed out that the number of living coral species in the southwestern coastal reefs of Leizhou Peninsula increased significantly compared with the previous year.

3/ Seagrass

SAP Targets and Summary of Achievements

The goal of the Strategic Action Programme for the South China Sea is to reduce seagrass habitat degradation and reduction, with specific targets for the protection, management, and sustainable use of seagrass bed. The goal in China is to protect and manage seagrass ecosystems in a sustainable manner. The main tasks focus: 1) Promoting improvement of laws, regulations and policies of seagrass sustainable management and ecological protection; 2) Promoting the effective implementation of the seagrass bed ecological protection system, and strengthening the capacity building for seagrass bed nature reserves; 3) Establishing a performance evaluation mechanism for seagrass bed management and protection 4) Enhancing scientific survey and research, and public education of seagrass bed protection. The Strategic

Action Programme identifies four known seagrass sites in China with a total area of 1,960 ha, including: Hepu (540 ha), Liushawan (900 ha), Li'an (320 ha) and Xincun (200 ha). Among them, Hepu seagrass bed was National Dugong Reserve with the medium management effectiveness in 2008.Table 3 below summarizes achievements during 2008-2021 under every regional output of the SAP for seagrass in China.

Table 3. Regional SAP target for seagrass and achievements (ha) during 2008-2021 in China

Regional Output	Hepu	Liushawan	Li'an & Xincun	Total
1.3.1 Twenty seagrass areas totaling 26,036 ha under sustainable management with supporting laws and regulations	81.7/540	900	511/520	1,960*
1.3.2 Amended management plans for 7 existing MPAs with significant seagrass areas, to include specific seagrass-related management actions and policy, legal and institutional reforms	540	900	520	1,960
1.3.3 Designation of 7 new Marine Protected Areas focusing on seagrass areas identified in the prioritized listings of the SCS Project	NA	NA	NA	NA
1.3.4 Established mechanism for monitoring seagrass habitat management	540	-	520	1,040

** The numbers in table 2 reflected area (ha) of the sites where segrass beds located. The area in hectare of seagrass may be different and smaller, e.g: Hepu seagrass area is only 81.7ha but not 500ha.*

Descriptions

1.3.1 Twenty seagrass areas totaling 26,036 ha under sustainable management with supporting laws and regulations

1.3.1.1 Hepu

Hepu site covers an area of 540 hectares. Seagrass in this site is mainly distributed in Hepu Dugong National Nature Reserve of Guangxi Zhuang Autonomous Region and its adjacent waters. The analysis of historical data showed that seagrass distribution area in Hepu had great seasonal and annual variations. The 2020 bulletin showed that the area of Hepu seagrass distribution was about 81.7 hectares[24]. The reserve aims to conserve natural ecosystems of seagrass beds and adjacent sea areas.

Guangxi Zhuang Autonomous Region has constantly improved regulations and management regime related to seagrass beds to strengthen its protection and restoration. Hepu Dugong National Nature Reserve strictly implements the Regulations of the People's Republic of China on Nature Reserves (revised in 2017), prohibiting all activities except for necessary those such as survey, scientific research, etc. Regulations on Wetland Protection of Guangxi Zhuang Autonomous Region was formulated and implemented in January 2015, and the article 35 of which regulates that the people's governments at various levels in autonomous region and the competent authorities concerned should, in accordance with relevant laws and regulations, take measures to protect and restore the biological species in typical ecological systems such as mangroves, coral reefs and seagrass beds. The scheme of Guangxi Marine Ecological Red Line Delineation was issued in 2017. According to the Technical Guideline for National Ecological Red Line Delineation - Ecological

[24] Ecological and Environmental Status Bulletin of Guangxi Zhuang Autonomous Region in 2020.

Functional Baseline (tentative), the scheme defines seagrass beds and other marine ecological sensitive areas as ecological red line areas with strict protection. For instance, Guangxi Hepu Dugongs Reserve is defined as banned and restricted categories of red line areas with the ecological protected objects of seagrass ecosystem and its habitat, along with *Sousa chinensis, Tachypleus tridentatus, Hippocampus* sp., etc.

1.3.1.2 Liushawan

The Liushawan site covers 900 hectares. Its spatial scope includes the inner waters of Liusha Bay and Leizhou Seagrass Nature Reserve. Guangdong Province has been improving regulations and management regime related to seagrass beds to strengthen its protection and recovery. Leizhou Seagrass Nature Reserve strictly implements laws and regulations about nature reserves to protect and improve seagrass resources. Any activities in construction and production are prohibited in the core zone. The scientific research activities on the reserve need to be permitted by the administrative authority of the reserve. The protected areas comply with the standards for first class seawater quality. The scheme of Guangdong Province Marine Ecological Red Line Delineation was issued in 2017. According to the Technical Guideline for National Ecological Red Line Delineation - Ecological Functional Baseline ((tentative), the scheme defines seagrass beds and other marine ecological sensitive areas as ecological red line areas with strict protection. the Liushawan seagrass site is defined as the restricted category of the red line area, and Leizhou seagrass Nature Reserve is defined as the prohibited category of the red line area to protect seagrass bed resources and habitats.

1.3.1.3 Li'an & Xincun

Li'an & Xincun sites covers 520 hectares, including Li'an 320 hectares and Xincun 200 hectares. Seagrass in the 2 areas is mainly distributed in the Seagrass Special Reserve of Xincun Port and Li'an Port in Lingshui, Hainan. The 2009 survey showed that the distribution area of seagrass in the 2 demonstration areas was about 511 hectares[25].

Hainan Province has constantly improved regulations and management regime related to seagrass bed to strengthen its protection and recovery. The Seagrass Special Protected Areas of Xincun Port and Li'an Port in Lingshui, Hainan are under management in accordance with the Measures for the Management of Marine Special Reserve released in 2010. In 2021, the master plan of the reserve was formulated. and Lingshui Li Autonomous County published and implemented the Plan for the Project on Returning Ponds to Forest (Wetland) in Xincun Port and Li'an Port. The scheme of Hainan Province Marine Ecological Red Line Delineation was issued. According to the Technical Guideline for National Ecological Red Line Delineation - Ecological Functional Baseline (tentative), the scheme defines seagrass beds and other marine ecological sensitive areas as ecological red line areas with strict protection. Li'an and Xincun seagrass demonstration areas are located in Lingshui Li Autonomous County Priority Protected Area with the Restricted category of Marine Ecological Red Line area. In the area, it is encouraged that restoration of damaged seagrass bed and lagoon ecosystem.

1.3.2 Amended management plans for 7 existing MPAs with significant seagrass areas, to include specific seagrass-related management actions and policy, legal and institutional reforms

1.3.2.1 Hepu

Hepu site covers an area of 540 hectares. Hepu Dugong National Nature Reserve is located in the tieshangang sea area, Hepu County, Beihai City. Seagrass is one of the main protected objects in Hepu

25 Marine Environmental Status Bulletin of Hainan Province in 2009.

Dugong National Nature Reserve. Guangxi Zhuang Autonomous Region has been strengthening management and constructions of Hepu Dugong National Nature Reserve.

First activity was strengthening the infrastructure and management of the reserve[26]. Beihai and Shatian management and conservation stations have been set up as field scientific observation stations and marine animal rescue centers, regularly monitoring and publishing information on marine environment, marine organisms and seagrass resources. The ecological restoration projects of seagrass in the reserve have been carried out, and the illegal fishery facilities have been cleaned up. Besides, the exploitation and utilization of marine resources are being strictly supervised in the reserve. Secondly, patrol on law enforcement actions have been strengthened[27], including coastline, beach and offshore patrol on law enforcement. Thirdly, a special project was carried out to clean up illegal cultivation in the reserve and its surroundings[28]. From March to April 2011, the management station of the reserve implemented seagrass bed protection and restoration project. During implementation of the project, more than 100,000 illegal snail piles were dismantled. As a result, 12 hectares of illegal aquaculture farms were remedied to improve the ecological environment of seagrass beds. Fourthly, ecological restoration projects have been carried out in the reserve and its surrounding areas. The protection and restoration of seagrass bed habitat of the reserve were carried out in 2015. With artificial planting and restoration of seagrass, the total area of seagrass in Hepu had slightly increased[29]. Fifthly, relevant scientific research has been carried out these years. Third Institute of Oceanography, Ministry of Natural Resources, published the latest research results in 2021, identifying for the first time the distribution of potential suitable areas for seagrass bed along the South China coast, and mapping the priority areas for ecological protection and restoration of seagrass bed. This study can provide a scientific basis for the protection and restoration of seagrass beds and a useful planning tool for the management of ecological space in marine space. Among them, Hepu seagrass demonstration area is considered as a possible restoration priority area due to its strong adaptability and medium pressure[30].

1.3.2.2 Liushawan

The Liushawan site covers 900 hectares. Its spatial scope includes the inner waters of Liusha Bay and Leizhou Seagrass Nature Reserve. In recent years, Guangdong Provinve has been continuously strengthening the protection of seagrass bed of Liushawan site. Zhanjiang City implemented the Zhanjiang Liusha Bay Marine ecological restoration project in 2011, with a total investment of 15 million RMB, and the restoration area of 146.67 hectares. The project included planting mangroves, seagrass and seaweed in the tidal area for rebuilding ecological restoration demonstration area on mangrove wetland, seagrass and seaweed farms. In 2014, the Ocean and Fishery Bureau of Zhanjiang City implemented the marine ecological restoration project on seagrass and seaweed in Liusha Bay, with planting 66.67 hectares of Halophila ovalis[31].

1.3.2.3 Li’an & Xincun

26 Lin Jinlan et al.: Conservation Effectiveness of Hepu Dugong dugon National Nature Reserve of Guangxi Zhuang Autonomous Region.

27 Wetland Pearl - Coastal wetland of Hepu Dugong Reserve in Guangxi http://ex.chinadaily.com.cn/exchange/partners/82/rss/channel/cn/columns/t40vsk/stories/WS62021c35a3107be497a05875.html.

28 Hepu Nature Reserve to clean up illegal cultivation and protect sesegrass bed ecosystem - Bulletin of the region - website of the Oceanic Administration of Guangxi Zhuang Autonomous Region - hyJ.gxzf.gov.cn http://hyj.gxzf.gov.cn/gzdt/qnkb_66841/t3174977.shtml.

29 Wu Yuanjia, et al. : Changes of seagrass bed in Hepu, Guangxi and protection countermeasures.

30 W. Hu et al. Mapping the seagrass conservation and restoration priorities: Coupling habitat suitability and anthropogenic pressures.

31 Zhanjiang Liusha Bay marine ecological restoration project - seaweed, seaweed procurement project. Doc - college entrance examination - online document in full https://max.book118.com/html/2015/0706/20527642.shtm

Li'an and Xincun sites cover 520 hectares. The two areas are located in the Seagrass Special Reserve of Xincun Port and Li'an Port in Lingshui, Hainan, which was established in 2007 as the first special reserve for seagrass in China and the first marine special reserve in Hainan Province.

In recent years, Hainan has been continuously strengthening the protection of seagrass bed in the reserve. In order to strengthening the management of the reserve, the Forestry Bureau of Lingshui Li Autonomous County entrusted a third party to carry out constant patrol and strengthen supervision of the reserve in 2021. Ecological restoration projects have been carried out in the reserve. From 2012 to 2013, the reserve carried out artificial cultivation of seagrass, breeding filter-feeding shellfish, sponge and coral, and developed ecotourism to form a coordinated mode with seagrass resource protection and community economy development and science popularization education. Ecological restoration of forest and wetland from ponds were actively carried out in 2021, with a total area of 248.27 hectares.

On the other hand, Blue Bay Remediation Project have been carried out surrounding the reserve. For instance, in Lingshui Li Autonomous County, mangroves were enriched for 27.66 hectares, along with projects of returning ponds to forests. Blue Bay Remediation Project of Lingshui was completed in 2019[32]. Relevant scientific research has been also carried out these years. Third Institute of Oceanography, Ministry of Natural Resources, published the latest research results in 2021, identifying for the first time the distribution of potential suitable areas for seagrass bed along the South China coast, and mapping the priority areas for ecological protection and restoration of seagrass bed. This study can provide a scientific basis for the protection and restoration of seagrass beds and a useful planning tool for the management of ecological space in marine space. Among them, Li'an and Xincun seagrass demonstration areas are considered as possible restoration priority areas due to the strong adaptability and medium pressure[33].

1.3.3 Designation of 7 new Marine Protected Areas focusing on seagrass areas identified in the prioritized listings of the SCS Project

No new seagrass related MPA was established during 2008-2021

1.3.4 Established mechanism for monitoring seagrass habitat management

1.3.4.1 Hepu

Hepu site covers 540 hectares. Guangxi Beihai seagrass bed ecosystem is a national key ecological monitoring area. The relatively complete monitoring management mechanism has been established. Hepu demonstration area is located in the national key ecological monitoring area.

First, according to the national routine marine ecological environment monitoring plan, Beihai seagrass bed ecological monitoring area is monitored annually. The monitoring indicators include seagrass distribution area, community structure, coverage, density and biomass; community structure, habitat density and biomass of macrobenthos; water environment, sedimentary environment, fish tissue contaminants, etc. The evaluations include seagrass ecosystem health status, the analysis of its inter-annual variation trend, and the causes of change and stress factors, etc. The monitoring and evaluation results are released in the Bulletin of China's Marine Environmental Quality. From 2008 to 2021, China had carried out annual routine monitoring of Hepu seagrass bed which is included in the monitoring area of Beihai, Guangxi.

32 Marine Ecological and Environmental Status Bulletin of Hainan Province in 2019.
33 W. Hu et al. Mapping the seagrass conservation and restoration priorities: Coupling habitat suitability and anthropogenic pressures.

Second, Guangxi Zhuang Autonomous Region has established a local seagrass bed monitoring management mechanism, including Beihai Hepu seagrass bed and Fangchenggang Pearl Bay seagrass bed from 2008 to 2021. In addition to the national level monitoring and evaluation analysis contents, the local monitoring contents also cover the total number of bacteria, the community structure and density of phytoplankton, zooplankton, and Fish eggs and young fish, etc. The monitoring results were released to the public in the form of Guangxi Zhuang Autonomous Region Marine Environmental Quality Bulletin, Guangxi Zhuang Autonomous Region Ecological Environment Status Bulletin and Guangxi Marine Ecology Blue Book -- Guangxi Zhuang Autonomous Region Marine Ecological Status Monitoring Report. In addition, from 2008 to 2021, Guangxi Marine Environment Monitoring Center Station has been monitoring and surveying seagrass beds in Beihai, and other sea areas for 13 years[34] to know seagrass growth, health and biodiversity of seagrass bed ecosystem. The monitoring area covered about 7,500 hectares, and the monitoring indicators cover seagrass area, species, density, coverage, macrobenthos, etc.

Habitat improvement information: according to China Marine Environmental Quality Bulletin and other relevant reports, Hepu seagrass bed ecosystem had been in sub-health state for many years (during 2009 to 2018), and became healthy state from 2020 to 2021.and in 2021, seagrass cover, density and biomass in Hepu have all improved, with an average seagrass cover of 22.5%, the average density of 2,198 plants/m^2. During Survey of Hepu seagrass demonstration area from 2008 to 2021, 5 main kinds of seagrass, such as Zostera japonica, Halodule uninervis, Halotropium minor, H. bakericus and H.ovalis were collected. The survey data[35] from 2015 to 2020 showed that the change rage of seagrass area of Hepu seagrass bed was relatively great in recent years, and its seagrass area was 81.7 hectares in 2020[36].

1.3.4.2 Liushawan

So far, there is no routine monitoring mechanism of seagrass bed ecosystem in Liushawan at the national or local levels.

1.3.4.3 Li’an & Xincun

Li'an and Xincun demonstration areas cover 520 hectares. Seagrass bed ecosystem on the eastern coast of Hainan Province is a national key ecological monitoring area, and a relatively complete monitoring mechanism has been established. Li'an and Xincun demonstration areas are located in the national key ecological monitoring area. From 2008 to 2021, China had carried out monitoring of seagrass bed ecosystem health in five zones of the eastern coast of Hainan Island, including Xincun Port and Li'an Port, along with Gaolong Bay, Changpi Port and Long Bay.

First, according to the national routine marine ecological environment monitoring plan, seagrass bed ecological monitoring area of the eastern coast of Hainan Province is monitored annually. The monitoring indicators include seagrass distribution area, community structure, coverage, density and biomass; community structure, habitat density and biomass of macrobenthos; water environment, sedimentary environment, fish tissue contaminants, etc. The evaluation contents include seagrass ecosystem health status, the analysis of its inter-annual variation trend, and the causes of change and stress factors, etc. The monitoring and evaluation results are released in the Bulletin of China's Marine Environmental Quality.

Second, Hainan Province has established a local seagrass bed monitoring management mechanism. Routine monitoring in five zones of seagrass distribution waters on the eastern coast of Hainan Island from 2009 to 2021, including Li'an and Xincun seagrass demonstration areas. In addition to the national level monitoring

34 Guangxi completed the seagrass bed ecosystem survey in summer
https://baijiahao.baidu.com/s?id=1710885797009305105&wfr=spider&for=pc
35 A study on the situation and Task of Marine ecological environment protection in Guangxi during the 14th Five-Year Plan.
36 2020 Ecological and Environmental Status Bulletin of Guangxi Zhuang Autonomous Region in 2020.

and evaluation analysis contents, the local monitoring also cover the seagrass community structure, coverage, density and biomass in the Seagrass Special Reserve of Xincun Port and Li'an Port in Lingshui, Hainan from 2016 to 2018. The results of the monitoring were published in the Bulletin of Hainan Marine Environment (2009-2018) and the Bulletin of Hainan Marine Ecological Environment (2019-2020).

Habitat improvement information: from 2008 to 2021, in 5 seagrass distribution areas on the eastern coast of Hainan Island, including Li'an and Xincun seagrass demonstration areas， several species were collected such as Thalassia hemprichii, Enhalus acoroides, Cymodocea rotunda, H. ovalis, H. uninervis, Syringodium isoetifolium. The dominant species was T. hemprichii, followed by C. rotunda, E. acoroides and H. ovalis. Seagrass bed ecosystems were in a healthy state for many years (during 2008 to 2018), and in a sub-healthy state from 2019 to 2021. From 2016 to 2018, a total of 5 species of seagrass were collected in the Seagrass Special Reserve of Xincun Port and Li'an Port in Lingshui, Hainan. The average coverage of seagrass was 38.5% in Xincun Port and 38.2% in 2016, 32.4% in 2017 and 31.03% in 2018, respectively. Compared with that in 2008 (37% and 24%), there was an overall increase in average coverage. Surveys and research showed that the areas of seagrass distribution in Li 'an and Xincun sites are basically stable in recent years.

4/ Wetlands

SAP Targets and Summary of Achievements

The Strategic Action Programme aim to improve the effectiveness of national policy, legal and institutional arrangements and co-ordination including the needed national reforms by developing and implementing management plans for at least 3 lagoons (26,818 ha), 9 estuaries (614,680 ha), 5 tidal flats (96,903 ha), 1 peat swamp (45,700 ha) and 1 non-peat swamp (9,808 ha); declaring at least 7 wetland areas with protection status (i.e. non-hunting area, nature reserves, protected areas, Ramsar Sites) including the needed management reforms and adopting a regional estuary monitoring scheme and its national implementation. The goal of the Strategic Action Programme in China is to strengthen coastal wetland restoration and protection, mainly including integrated management. The main tasks focus on. 1) Improving relevant regulations, policies, and action plans for integrated management of coastal wetland. 2) Developing and implementing integrated management plans. 3) Strengthening capacity building, including scientific research and public education on coastal wetland protection and restoration. 4) Establishing monitoring scheme, including estuarine wetland. The Strategic Action Programme implementation in China would result in the adoption and implementation of management plan for 2 estuaries (13,866 ha), 1 lagoon (218 ha) and 3 tidal flats (6,192 ha). The target sites included: Pearl River estuary, Beilun river estuary, Wenchang lagoon, Shantou tidal flat, Danzhou tidal flat, Hepu tidal flat. Table 4 shows the summary of SAP and SCS SAP project wetlands targets and sites

Table 4. Summary of the SAP targets for coastal wetlands and achievements (ha) during 2008-2021 in China

Regional outputs	Pearl River	Beilun	Wen-chang	Shantou	Danzou	Hepu	Total
1.4.1 Integrated management plans developed and under implementation for at least 2 lagoons (21,818 ha), 10 estuaries (639,418 ha), 5 tidal flats (96,903	12,783	1,083	218	1,435	806	3,951	20,276

Regional outputs	Pearl River	Beilun	Wen-chang	Shantou	Danzou	Hepu	Total
ha), 1 peat swamp (45,700 ha) and 1 non-peat swamp (9,808 ha)							
1.4.2 Declaration of wetland areas with protection status (i.e. non-hunting area, nature reserves, protected areas, Ramsar Sites)	12,783	1,083	NA	1,435	NA	3,951	19,252
1.4.3 Adoption of a regional monitoring scheme and its national implementation	12,783	1,083	NA	NA	NA	NA	13,866

Descriptions

1.4.1 Integrated management plans developed and under implementation for at least 2 lagoons (21,818 ha), 10 estuaries (639,418 ha), 5 tidal flats (96,903 ha), 1 peat swamp (45,700 ha) and 1 non-peat swamp (9,808 ha)

1.4.1.1 Shantou

Shantou site is located in the Shantou wetland nature reserve of Shantou City, which covers an area of 1,435ha. The authority of Shantou city, in accordance with the relevant policies of the national and provincial governments on wetland protection and restoration, formulates and implements the policies of wetland protection and management. First, Shantou Municipal People's government issued the Executive Order on Implementation of the Ecological Compensation Mechanism in 2017 to explore the establishment of compensation mechanism for wetland protection. Second, to further strengthen wetland protection, lots of wetland restoration projects were constantly implemented in Shantou. During 2020 to 2022, two phases of Yifengxi ecological restoration project and coastline ecological restoration project have been carried out, with a total area of 925 ha concerned[37,38]. Among them, Yifengxi estuary had a restoration project with an area of 447ha to protect the wetland and bird habitats in 2020.

1.4.1.2 Pearl River Estuary

The area of the Pearl River Estuary site is 12.783 ha. In view of the fact that the Pearl River Estuary is an important estuarine ecosystem, the authority of Guangdong Province establishes and improves the regulations and policies for the integrated management of estuarine wetlands. Local governments of relevant cities in the Pearl River Estuary region have actively implemented relevant policies of the national and provincial governments on the protection and restoration of wetlands. First, the "Regulations on the Protection of Wetlands in Guangdong Province" was enacted in 2021, which stipulates the total amount control system for wetland area to ensure that there is no loss to the wetlands, neither in size nor in

37 Shantou Olive TV Station. the restoration of Yifengxi coastline in Chenghai District to create an ecological tourism and leisure resort in the eastern Guangdong city cluster. (2020-06-26).
https://www.sohu.com/a/404265194_120574100. (2020-06-26).

38 Chenghai Branch of Bureau of Shantou Ecological Environment. Announcement on the approval of Environmental Impact Assessment Documents of Yifengxi Shoreline Ecological Restoration Project (Phase II), Chenghai District, Shantou City. http://www.chenghai.gov.cn/stsstjchfj/gkmlpt/content/2/2090/mpost_2090746.html#4389. (2022-07-11).

ecological functions. Second, relevant departments formulated and implemented the wetland-related policies and action plans to form a policy toolkit for integrated wetland management. For instance, the Implementation Plan for Prevention and Control of Pollution in Coastal Waters of Guangdong Province (2018-2020) was issued, it aimed to improve the quality of wetland water environment; The Master Plan for Major Projects for the Protection and Restoration of key Ecosystems in Guangdong Province (2021-2035) was issued, with a number of major marine ecosystem protection and restoration projects in the Guangdong-Hong Kong-Macao Greater Bay Area. In 2020, the "Implementation Plan for the Construction Planning of Water bird Ecological Corridors in the Pearl River Delta Region" was issued, in which the project of the ecological corridor connection restoration for water bird protection were carried out in the nine cities in the Pearl River Delta.

1.4.1.3 Hepu

Hepu site is in the intertidal area of Hepu Dugong Nature Reserve. The site area is 3951 ha. The authority of Guangxi region, in accordance with the national wetland protection regulations and policies, formulates and implements wetland protection policies and action plans. First, the Regulations on the Protection of Wetlands of Guangxi Zhuang Autonomous Region was enacted in 2015. Second, the People's Government of Guangxi Zhuang Autonomous Region issued the "Executive order on Intensifying Coastal Wetland Protection and Land Reclamation Management" in 2019[39]. Third, remediation of intertidal wetlands was carried out, e.g. in the Dugong nature reserve, the cumulative area to be remedied reached to 23 square kilometers in the past five years[40].

1.4.1.4 Beilun estuary

The Beilun estuary site covers an area of 1,083 hectares, which is located in the Beilun Estuary Nature Reserve. The authority of Guangxi region, in accordance with the national wetland protection regulations and policies, formulates and implements the policies and action plans for Beilun estuary wetland protection. First, “the Administrative order on Shankou National Nature Reserve and Beilun Estuary National Nature Reserve of Guangxi Zhuang Autonomous Region” was issued in 2018 and updated in 2021. Second, the Master Plan of Beilun Estuary National Nature Reserve of Guangxi Zhuang Autonomous Region (2011-2020) was formulated. Third, the co-management mechanism was established jointly by the local communities and the nature reserve. And the co-management committee holds meetings regularly to discuss issues concerning ecological protection and sustainable use of the resources in the protected areas. Fourth, projects on wetland restoration were carried out. As a result, a total of 6.67 hectares of rare plants were recovered in the coastal intertidal zone[41].

1.4.1.5 Wenchang

Wenchang site is located in Wenchang City in the northeast of Hainan Province, with an area of 218 ha. The authority of Hainan province, in accordance with the national regulations and policies on wetland protection, formulates and implements wetland protection policies and action plans. First, in 2018, the Regulations on the Protection of Wetlands of Hainan province was enacted, it aims to intensify wetland protection. Second, the authority of Wenchang City formulated the "Special Action Plan for Forestry Ecological Restoration and Wetland Protection" (2016-2020) [42] to strengthen wetland restoration and

39 People's Government of Guangxi Zhuang Autonomous Region. Executive order on Intensifying Coastal Wetland Protection and Land Reclamation Management. http://www.gxzf.gov.cn/zwgk/zfwj/20190325-741011.shtml. (2019-03-25).
40 China Daily. Guangxi Hepu Dugong Reserve. http://cn.chinadaily.com.cn/a/202204/18/WS625cdc93a3101c3ee7ad0f25.html. (2022-04-18)..
41 China Wetland Museum. Guangxi Beilun Hekou National Nature Reserve.
http://sdbwg.hzxh.gov.cn/art/2011/12/30/art_1228452_2130671.html. (2011-12-30).
42 Website of Wenchang Municipal People’s Government. Understanding on Wenchang's 13th Five-Year Plan for Ecological

improve wetland habitats. In 2017, Wenchang completed the wetland restoration project to return 8.67 ha of ponds to forest, and 13.33 ha to wetland[43]; during 2018 to 2020, a total area of 619.88 ha was recovered from returning ponds to forests and wetlands[44] In 2018, "action plan for returning pond to forest land and wetland in Qinglangnag Mangrove Provincial Nature Reserve" was issued, and the restoration targets in the plan were basically completed till 2021.

1.4.1.6 Danzhou

Danzhou site includes the coastal area of Dan County and Lingao City. The site area is 806 ha. The authority of Danzhou city, in accordance with national and provincial wetland protection regulations and policies, formulated and implemented the action plan for wetland protection. First, Danzhou Wetland Resources Conservation Plan (2017-2030) was formulated. Second, wetland ecological restoration projects were carried out. In 2019, the project of returning ponds to forests was implemented with169.02 ha of withdrawn ponds. In 2020, Xinying Mangrove National Wetland Park was designated as a Ramsar Site of International Importance with a wetland area of 310.59 ha. Plenty of works have been made to improve the monitoring system in Xinying Mangrove National Wetland Park. Until 2021, 2 water quality monitoring sites, 2 bird watching sites, 8 crabs and mudskipper monitoring sites, 2 alien species monitoring sites and few mangrove pest monitoring sites were set. A monitoring station center was set with technical staffs. In addition, the equipment such as patrol boats and cars, telescopes and cameras were established to strengthen monitoring capability.

1.4.2 Declaration of wetland areas with protection status (i.e., non-hunting area, nature reserves, protected areas, Ramsar Sites)

1.4.2.1 Shantou

Shantou site is located in the Shantou wetland nature reserve of Shantou City, which covers an area of 1,435ha. The nature reserve was established in 2001 with the approval of Shantou Municipal People's Government. In 2017, Shantou Municipal Bureau of Agriculture and Rural Affairs formulated and declared the four boundary of Shantou Wetland Nature Reserve[45]. In addition, Guangdong Province formulated and declared the document on "Marine Ecological Red Line of Guangdong Province" in 2017, in which Shantou Wetland Nature Reserve is included within the ecological red line area to further strengthen wetland protection.

1.4.2.2 Pearl River Estuary

The area of the Pearl River Estuary site is 12,783ha. The authority of Guangdong Province has continuously strengthened wetland protection and established a wetland protection network system in the Pearl River Estuary region. At present, it was established and declared that two national nature reserves (Pearl River Estuary Chinese White Dolphin National Nature and Guangdong Neilingding Futian National Nature Reserve), two national important wetlands (Guangdong Chinese White Dolphin National Important Wetland and Shenzhen Futian Mangrove National Important Wetland), three national wetland parks (National Wetland Park of Overseas Chinese Town in Shenzhen , Guangdong Province; National Wetland

Environmental Protection. http://wenchang.hainan.gov.cn/wenchang/zxjd/201811/2e8c80e4d148410288028b37c1f9df72.shtml. (2018-11-14).

43 Wenchang Forestry Bureau. Wenchang City completed the task of afforestation ahead of schedule in 2017. http://wenchang.hainan.gov.cn/wcslyj/gzdt/201712/c3e0c1317db54b789b18b1553171f76f.shtml. (2017-12-05).

44 South China Sea Network Hainan News. Protecting mangroves, Wenchang has returned nearly 667 acres of ponds to forest and wetland. https://www.163.com/dy/article/FJS92IPL053469JX.html. (220-08-12).

45 Shantou Agriculture and Rural Administration (Rural Revitalization Administration). Announcement on the Four boundary of Shantou Wetland Nature Reserve. https://www.shantou.gov.cn/nyj/zwgk/tzgg/content/post_928876.html. (2017-12-21).

Park of Machung Huayang Lake in Guangdong Province; Tsuiheng national wetland park in Zhongshan City in Guangdong Province). The Guangdong National Important Wetland of Chinese White Dolphin is located in the Chinese White Dolphin National Nature Reserve, and the Shenzhen Futian Mangrove National Important Wetland is located in the northeast of Shenzhen Bay. The established nature reserves and wetland parks has played an important role in the protection of Pearl River estuary wetlands, which cover mangroves, estuarine waters, intertidal wetlands. and key protected birds habitats, etc.. In addition, the authority of Guangdong province formulated and promulgated the "Marine Ecological Red Line of Guangdong Province " in 2017, in which the Pearl River Estuary wetland is included in the ecological red line area to further strengthen wetland protection.

Designated wetland protection areas in the Pearl River Estuary Site and its adjacent areas

No.	Name	Wetland area (ha)	Protection status	Year of declaration	Adoption entity
1	Guangdong Chinese White Dolphin National Important Wetland	The protected area is 46,000 ha, of which 38,578 ha is wetland (There is overlap between the protected area and the site)	National Nature Reserve; National Important Wetland	2003 (National Nature Reserve; 2020 (National Important Wetland)	State council National Forestry and Grassland Administration
2	Shenzhen Futian Mangrove National Important Wetland	367.64	National Nature Reserve; National Important Wetland	1988 (National Nature Reserve; 2020 (National Important Wetland)	National Forestry and Grassland Administration
3	Guangdong Neilingding Futian National Nature Reserve	The area of the protected area is 921.64 ha, of which 408 ha are wetlands.	National Nature Reserve	1988	National Forestry and Grassland Administration
4	National Wetland Park of Overseas Chinese Town in Shenzhen,	The area of the protected area is 68.5 ha, of which 50.13 ha are wetlands	National Wetland Park	2016 (Municipal wetland park; 2020（National Wetland Park）	Shenzhen Municipal Government National Forestry and Grassland Administration
5	National Wetland Park of Machung Huayang Lake	351.97	National Wetland Park	2021（National Wetland Park）	National Forestry and Grassland Administration
6	Tsuiheng national wetland	625.6	National Wetland Park	2019	National Forestry and

	park in Zhongshan City				Grassland Administration
7	Guangdong Zhuhai Hengqin National Wetland Park (Pilot)	327.4	National Wetland Park	2017	State Forestry Administration
8	Coastal wetland of Qi'ao Island at the mouth of the Pearl River	7,363	Provincial nature reserves	2004	People's Government of Guangdong Province

1.4.2.3 Hepu

Hepu site is also the shallow tidal flat wetland area of Hepu Dugong National Nature Reserve. The site area is 3,951ha. Hepu Dugong National Nature Reserve in Guangxi Zhuang Autonomous Region was established in 1986 and upgraded to a national Hepu Dugong Nature Reserve in 1992. The Hepu Dugong was listed as an important wetland in Guangxi Autonomous Region by Guangxi Forestry Administration in 2020. The authority of Guangxi formulated and promulgated the "Guangxi Marine Ecological Red Line Demarcation Plan", in which the Hepu site is included into the ecological red line area to further strengthened the protection of wetland resources.

1.4.2.4 Beilun estuary

The Beilun estuary site is located in Beilun Estuary National Nature Reserve, with a total area of 1,083 hectares. Beilun Estuary National Nature Reserve was listed as a wetland of international importance in 2008. In 2021, the People's Government of Fangchenggang City formulated and published the executive order on the Ecological Environment Zoning Control with "Three Lines and One List in Fangchenggang City "[46], in which important coastal wetlands is included in the ecological red line area.

1.4.2.5 Wenchang

Hainan Wenchang Lagoon Wetland Site is located in Wenchang City, with a wetland area of 218 ha. Part of the wetland Site is located in the Qinglan Port Provincial Nature Reserve in Hainan. The nature reserve was approved for established in 1981 and was upgraded to a provincial nature reserve in 1992. The authority of Hainan Province formulated and promulgated the Regulations on the Ecological Red Line Management[47], and declared the notice on the Ecological Red Line Demarcation in Hainan Province[48], in which Wenchang's wetlands are included into the red line to enhances the protection of wetland resources. The authority of Wenchang City formulated and declared the executive order on the Ecological

46 Fangchenggang Municipal People's Government. the executive order on the Ecological Environment Zoning Control with "Three Lines and One List in Fangchenggang City.
http://www.fcgs.gov.cn/xxgk/jcxxgk/zcwj/gfxwj/sbjwj/szfwj/202110/t20211014_222230.html. (2021-10-14)
47 Department of Natural Ecology and Conservation, Department of Ecology and Environment of Hainan Province. Regulations on the Ecological Red Line Management in Hainan Province.
http://hnsthb.hainan.gov.cn/xxgk/0200/0202/hjywgl/stbh/201901/t20190106_2126022.html. (201608-08).
http://hnsthb.hainan.gov.cn/xxgk/0200/0202/hjywgl/stbh/201901/t20190106_2126022.html. (201608-08).
48 People's Government of Hainan Province. notice on the Ecological Red Line Demarcation in Hainan Province
https://www.hainan.gov.cn/hainan/szfwj/201609/72b1cb661ff54f6dac6e59b22632c271.shtml. (2016-09-26).

Environment Zoning Control with "Three Lines and One List"[49], in which wetlands with rich biodiversity are include into the ecological redline area.

1.4.2.6 Danzhou

Hainan Danzhou Lingao intertidal wetland site, with an area of wetland of 806 ha, which includes the offshore and nearshore areas of Tan County and Lingao City. In 2021, the authority of Danzhou City formulated and declared the executive order on the Ecological Environment Zoning Control with "Three Lines and One List" in Danzhou City[50], and in which the important wetlands of Danzhou are included in the ecological red line area to protect wetland resources and habitats.

1.4.3 Monitoring scheme for wetland management

1.4.3.2 Pearl River Estuary

The area of the Pearl River Estuary site is 12,783ha. The Pearl River Estuary Demonstration Area and its adjacent areas constitute the Pearl River Estuary ecosystem. The Pearl River Estuary ecosystem is a key national Marine environment monitoring area. According to the national routine Marine ecological environment monitoring plan, the state carries out annual monitoring of the estuarine ecosystem. The main monitoring indicators include water quality, sediment, marine organisms, phytoplankton, and macrobenthos, etc. In addition, in 2019, remote sensing technology was used to monitor the wetland area of the Pearl River Estuary. The results of monitoring and evaluation are released to the public in the form of the Bulletin on the China's Marine Ecological Environment Condition. The evaluation results of these bulletins show that the ecosystem health status of the Pearl River Estuary is unhealthy from 2008 to 2009, and sub-healthy from 2010 to 2021[51].

1.4.3.4 Beilun estuary

The Beilun estuary site has established a relatively complete monitoring management mechanism.

Firstly, the nature reserve is one of the national typical marine ecosystem monitoring areas. The monitoring work is carried out annually in the area according to the national routine marine ecological environment monitoring plan. Monitoring indicators include mangrove species and area, water quality, plankton species, benthic species, intertidal benthos species, alien species and so on. Monitoring results published in Bulletin on China's Marine Ecological Environment. According to the monitoring evaluation, mangrove ecosystem in site was healthy during 2008-2021, except for the year 2010 and 2012.

Secondly, the National Forestry and Grassland Administration conducted a coastal wetland resources special investigation demonstration project in the site, which finished in 2020. Monitoring indicators concern wetland natural geographical environment, wetland vegetation, wetland animals, wetland protection and utilization, status and so on. The result shows that mangrove ecosystem in site was generally healthy, mangrove community was stable, the number of benthic species was rich, and the wetland quality

49 Bureau of Ecology and Environment of Wenchang. executive order on the Ecological Environment Zoning Control with "Three Lines and One List" in Wenchang City.
http://wenchang.hainan.gov.cn/wenchang/0400/202106/23bf1d84bf68415ea93501c47797c13a.shtml. (2021-06-29).
50 Danzhou Municipal Party Committee Office, Danzhou Municipal People's Government Office. the executive order on the Ecological Environment Zoning Control with "Three Lines and One List" in Danzhou City
https://www.danzhou.gov.cn/danzhou/zfxxgkzl/bm/hbj/gkml/202106/P020210623385623593873.pdf. (2021-06-18).
51 Department of Ecology and Environment of Guangdong Province. Bulletin of the ecological environment in Guangdong Province from 2018 to 2021.

was generally good. In addition, National Forestry and Grassland Administration established the Beilun Estuary Wetland Ecosystem Positioning Observation and Research Station in Guangxi[52].

Thirdly, as internationally important wetlands, the site is monitored and surveyed according to the National Standard on Important Wetland Monitoring indicator System (GB／T 27648--20 11). Monitoring indicators concern water quality, wetland plants and vegetation, birds, alien species, impact of human activities, and so on. Monitoring evaluation is published in Ecological Status of China's Internationally Important Wetlands.

Habitat improvement. Firstly, with bird habitat protection and restoration, 299 bird species were recorded in 2021, which is a significant increase from 187 when the reserve was established[53]. Secondly, according to Bulletin on China's Marine Ecological Environment, mangrove density and macrobenthos density increased significantly over last year.

EXPERIENCE AND CHALLENGES

Experience

Since implementation of SAP started in 2008, China had experienced great progress and made great achievement in ecological environment protection. China implemented many activities that contributed to successful achievement of the SAP targets and tasks in the coastal habitat protection and restoration including mangroves, coral reefs, seagrass and wetlands.

Firstly, completed governance reform of the organizational structure of ecological environment and natural resources: China unveiled a state-level institutional reform of government structure in 2018. As far as coastal habitat protection and management is concerned, the primary functions of the three newly restructured organizations are specifically as follows: i) The Ministry of Natural Resources is primarily responsible for the inventory, registration, monitoring and assessment of coastal and marine resources and spatial use planning and ecological restoration. ii) The National Forestry and Grassland Administration is principally responsible for overseeing and managing wetland resources; developing wetland conservation plans; overseeing and stewarding wetland use and exploitation activities. iii) The Ministry of Ecology and Environment is mainly focusing on establishing and perfecting a fundamental regime for ecology and environment governance, such as developing and overseeing the implementation of marine ecological and environmental protection plans, supervision of marine pollution prevention and control, inspections on coastal habitat protection performance. This institution reform enhances the coastal habitat management.

Secondly, improved law and regulation system in coastal habitat protection and restoration: i) the Wetland Protection Law was promulgated in 2021, strengthening the top-level design of coastal wetland protection and restoration. "Marine Environmental Protection Law" also clearly stipulate the effective regulations to protect mangroves, seagrass, coral reefs and coastal wetlands. Guangdong, Guangci and Hainan provincial governments also made inspiring progress in pushing forward legislation on wetland conservation, resulting in the enactment of provincial wetland regulations or directives. ii) the Opinions on delineating and strictly observing the red line for ecological protection was released in 2017. The red line for ecological protection

52 Guangxi Zhuang Autonomous Region Development and Reform Commission. Approval document on the Feasibility Study Report of the Beilun Estuary Wetland Ecosystem Positioning Observation and Research Station in Guangxi. http://lyj.gxzf.gov.cn/zfxxgkzl/fdzdgknr/flfgzcwj/qtbmwj/t11344326.shtml. (2022-02-28).
53 Guangxi News Network. 299 species of birds have been recorded in Beilun Estuary Nature Reserve. https://baijiahao.baidu.com/s?id=1735415706862365749&wfr=spider&for=pc. (2022-06-22).

is an important management tool in spatial planning for coastal habitat conservation. Relevant technical specifications were formulated. For instance, the technical guidelines for designation of ecological function baseline under the national ecological red line (tentative) regulated the Marine ecological sensitive area such as mangroves, coral reefs, seagrass bed and coastal wetland as ecological red line zone with strict protection. iii) Ministry of MEE has been strengthening oversight and supervision of the coastal habitat protection, which promote compliance with laws and regulations.

Thirdly, the goals and tasks of the SAP were integrated into national policy framework and action plans for coastal habitat conservation and restoration: i) Replanting of deforested mangrove land.in 2020, the MNR and NFGA jointly released the Special Action Plan on Mangrove Conservation and Restoration (Year 2020-2025). Targeting the current status of relatively low area of mangroves and degradation of mangrove habitats, this Plan aims to plant 9,050 hectare of mangroves and restore existing degraded 9,750 hectare of mangroves by 2025. Mangrove area in China has continued to grow, showing an increase of 7,000 ha from 2000 to 2019. ii) In 2016, the State Council released China's wetland management policy—the Wetland Conservation and Restoration Scheme. The policy outlined the overall goal, implementation strategies and supporting polices to be put in place for wetland management. All provinces, autonomous regions and municipalities also gave their prompt and positive responses with the releases of their provincial implementation plans. China constantly supports and promote engineering projects of coastal wetland protection and restoration. iii) In 2020, the National Development and Reform Commission and the Ministry of Natural Resources released the Mater Plan for the Major Programme of Protecting and Restoring Ecosystems of National Importance (2021-2035). Coastal habitats (mangroves, seagrass and coastal wetlands) conservation and restoration was one of the priority areas identified in the master plan.

Fourthly, established the financing mechanisms to support conservation and restoration of coastal habitats. i) The Blue Bays Programme, launched in 2016, has funded the ecological restoration of a collective amount of 54,000 mu (or 3,600 hectares) of coastal wetlands including mangroves. The state has financially supported 13 "blue bay" eco-restoration projects in recent years, of which mangrove protection and restoration is the main action. ii) With the Wetland Conservation and Restoration Funds, the National Forestry and Grassland Administration (NFGA) supported the wetland (mangroves, coral reefs, seagrass and coastal wetland) nature reserves and national parks at the provincial level and above. iii) Since 2016, the Ministries of Finance, Natural Resources, and Ecology and Environment have allocated funds to the Mountain-Water-Forest-Farmland-Lake-Grassland Ecological Restoration Programme to restore ecological health in 25 key ecological function areas including coastal area across the country.

Challenges

Firstly, there are unevenness on progress among priority sites of the SAP. Some sites made great achievements, whereas few of sits lacked monitoring evaluation. The reasons are as follows: i) the priority sites as national important areas such as national nature reserve had many resources to support activities, the other priority sites lacked enough resources. ii) the boundaries of some priority sites are not inconsistent with the administrative divisions, which leads to unclear responsibilities of implementing activities.

Secondly, integrated management of sites faces challenges. The integrated management of sites involves multiple government organs respectively responsible for environmental protection, agriculture, coastal and marine resources and etc., which requires good coordination. In addition, integrated management requires a more comprehensive scientific knowledge and qualified technical team. At sites, there is a capacity building need to build a comprehensive team with rich practical and theoretical knowledge.

Thirdly, the SAP has not been updated since 2008. During this period, relevant international conventions and initiatives have made great progress. Relevant national initiatives and action plans have been updated

at least two times. These international and national progress made some contents of the SAP inappropriate to the national priority and practice. So, the SAP need to be updated periodically to adapt to international and national priority and practice.

Fourthly, on conservation and restoration of coastal habitats including mangroves, coral reefs, and seagrass and wetlands, there are a few of emerging problems and hot issues that the state concerns highly. These issues were not included in the activities of priority sites of the SAP. For example, the management of invasive alien species is getting tougher and harder when almost none of the prevention and control efforts has turned out to be useful in halting the expansion of invasive species.

Fifthly, market-based innovative financing mechanisms are not yet established for coastal habitat conservation and restoration. exploring market-based eco-compensation models will help establish a self-sustained mechanism driven by environmental service trading in itself.