Implementing the Strategic Action Programme for the Yellow Sea Large Marine Ecosystem: Restoring Ecosystem Goods and Services and Consolidation of a Long-term Regional Environmental Governance Framework (UNDP/GEF YSLME Phase II Project)

Technical Report on Habitat series no.1

Technical Proposal to Establish Xiaoyangkou of Rudong, Jiangsu Province of PR China, as a National Marine Protected Area

Dr. Zhaohui ZHANG
First Institute of Oceanography
State Oceanic Administration of PR China

Implementing the Strategic Action Programme for the Yellow Sea Large Marine Ecosystem: Restoring Ecosystem Goods and Services and Consolidation of a Long-term Regional Environmental Governance Framework
(UNDP/GEF YSLME Phase II Project)

Technical Report on Habitat series no.1

Technical Proposal to Establish Xiaoyangkou of Rudong, Jiangsu Province of PR China, as a National Marine Protected Area

Dr. Zhaohui ZHANG
First Institute of Oceanography
State Oceanic Administration of PR China

Technical Proposal to Establish Xiaoyangkou of Rudong, Jiangsu Province of PR China, as a National Marine Protected Area

March 2018

Published by the UNDP/GEF Yellow Sea Large Marine Ecosystem (YSLME) Phase II Project. Printed in the Republic of Korea.

Citation: Zhaohui Zhang, 2018. YSLME Technical Report on Habitat Series No. 1: Technical Proposal to Establish Xiaoyangkou of Rudong, Jiangsu Province of PR China, as a National Marine Protected Area. UNDP/GEF Yellow Sea Large Marine Ecosystem (YSLME) Phase II Project, Incheon, Republic of Korea.

UNDP/GEF Yellow Sea Large Marine Ecosystem (YSLME) Phase II Project is funded by the United Nations Development Programme/Global Environment Facility (UNDP/GEF) and implemented by UNOPS with support from the Governments of PR China and the Republic of Korea.

YSLME Phase II Project
Incheon Secretariat
5th floor, G-Tower
175 Art center-daero, Yeonsu-gu
Incheon 22004 RO Korea

Dalian Office
National Marine Environment Monitoring Center of State Oceanic Administration
P.O. Box 303, Linghe Street 42
Dalian 116023
Liaoning, PR China

Table of Contents

Preface

The United Nations Development Program/Global Environment Facility (UNDP/GEF) is providing assistance through the United Nations Office for Project Services (UNOPS) to countries bordering the Yellow Sea in support of their efforts to address, among others, the increasing trends of depleting fishery stocks, loss of coastal wetlands, land and sea-based pollution and the implementation of the Yellow Sea Large Marine Ecosystem Strategic Action Programme (YSLME SAP) adopted by PR China and RO Korea, with the support of DPR Korea. One of the assistance programs to implement the SAP is the UNDP/GEF/UNOPS project entitled Implementing the Strategic Action Programme for the Yellow Sea Large Marine Ecosystem: Restoring Ecosystem Goods and Services and Consolidation of a Long-term Regional Environmental Governance Framework, or the UNDP/GEF YSLME Phase II Project. Launched on July 13, 2017, where the stakeholders met and built consensus on the project objectives and approaches, agreed to the project workplan for 2017-2019, and discussed on the roadmap towards a sustainable arrangement for effective ecosystem-based management of Yellow Sea in accordance with the YSLME Strategic Action Programme.

One of the Outputs of the project is to strengthen the MPA network in the YSLME, based on assessment of distribution of endangered and threatened marine mammals, spawning, nursery and feeding grounds, cold water mass, and endangered migratory waterbirds, etc.

Some studies have been done in recent years by both government agencies in charge of migratory bird species and research institutes because of increasing importance being paid by the international conservation community. The World Conservation Congress 2016 adopted a resolution on the Conservation of intertidal habitats and migratory waterbirds of the East Asian-Australasian Flyway (EAAF), especially in the Yellow Sea, in a global context in response to the alarming inclusion to the IUCN Red List of six additional migratory waterbird species as Globally Threatened or Near Threatened, due to the rapid conversion rate of intertidal wetlands in the EAAF, particularly the Yellow Sea. Conservation of migratory waterbirds have received significant attention in both PR China and RO Korea in recent years, the outcomes of which include calling for conservation of intertidal areas, and increased recognition of the importance of intertidal ecosystems and their stronger protection. In June 2015, PR China created the China Coastal Wetland Conservation Network to increase the awareness and cooperative actions to protect coastal wetlands among government and society.

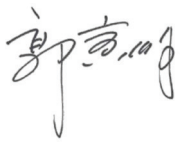
The scientific community is also active in improving the understanding of the conservation status of migratory waterbirds. Bird conservation priority areas were evaluated by the Institute of Geographical Sciences and Natural Resource Research of the Chinese Academy of Sciences (IGSNRR/CAS). The study found that 67 of the 110 priority sites in accordance with the criteria of Ramsar and Important Bird Areas lie outside protected areas, and some critical habitats for waterbirds are not covered in any type of protected area especially in Jiangsu Province. In particular, five coastal habitats critical for migratory waterbirds identified by the study could serve as the basis for MPA expansion and conservation to achieve the target of *maintaining areas of critical habitats at baseline level* under Outcome 4.1 of the UNDP/GEF YSLME Phase II Project.

Based on the value of irreplacability index of the priority sites with conservation gaps, the YSLME Phase II Project has prioritized the establishment of an MPA for the critical habitats of the Rudong Mudflat, a staging site along the eastern line of EAAF and habitat for the spoon-billed sandpiper, a critically endangered species under IUCN. In a survey, 143 spoon-billed sandpipers were recorded, accounting for about 40 percent of the global population of the species. Ten threatened species of waterbirds and 32 species of waterbirds, the population of which have reached one percent of the global population, are also recorded in the Rudong Mudflat, according to IGSNRR/CAS.

To protect this globally important mudflat, it is necessary to designate it as a protected area for the spoon-billed sandpiper and other waterbird species. At the request of the Ocean and Fisheries Bureau of the Rudong Government, the YSLME Phase II Project has supported a study on the establishment of the Xiaoyangkou intertidal area as a national MPA. Specific activities of the study include:

1. Review existing information (e.g., physical, biological, social, economic, policies, legislation) and describe the 'context' and 'rationale' of the protected area;
2. Identify stakeholders and establish a transparent consultation process, which may involve meetings with individual interest groups and for all stakeholders together, in particular experts interested in the species in coordination with the EAAFP Secretariat and IGSNRR/CAS;
3. Verify the proposed protected and mapped areas proposed by the Institute of Geographical Sciences and Natural Resource Research of Chinese Academy of Sciences;
4. Design management actions and interventions, including boundaries and zonation schemes and acceptable mechanisms for enforcement and compliance;
5. Analyze constraints, opportunities, threats, issues, problems, and capacity needs, and identify solutions through consultation with stakeholders and interest groups;
6. Formulate vision, objectives and, where appropriate, targets;
7. Determine financing mechanisms, bearing in mind the need for benefit and revenue sharing with stakeholders; and
8. Establish monitoring and evaluation protocols, including a process for periodic review and revision.

The Project Management Office wishes to extend its appreciation to Dr. Zhaohui Zhang of the First Institute of Oceanography of the State Oceanic Administration of PR China and his team for surveying the project areas and completing the report within the timeframe to enable timely review of the proposal for establishing the project area as a national MPA. Hopefully, through partnership with other players including NGOs dedicated to the protection and conservation of intertidal areas and waterbirds, the government of Rudong can become a constructive member of the EAAF Network for improving the conservation status of the migratory waterbirds.



Yinfeng Guo
Chief Technical Adviser and Manager
UNDP/GEF YSLME Phase II Project

1 Methodologies and Field Visits

1.1 Methodologies

The Project has established the following methodologies in completing the assignments.

(1) Data Collection

Physical, biological and social economic data of the proposed area were collected from published official documents of this area.

(2) Field Survey

A field survey on the Xiaoyangkou wetland was conducted to figure out the baseline information of wetland macrobenthic for waterbirds. During the field survey, a local tractor driver was hired to take the survey team to the sampling site. In total, eight (8) sites were sampled. In each site, three 25 cm x 25 cm replicates were taken. Sediment samples were also taken at each site.

(3) Sample Treatment

Samples were sieved on land through 500 μ m mesh stainless sieves and then fixed with 70 percent ETOH. In the lab, each sample was stained with five percent Rose Bengal for 24 hours and sorted by the lowest possible taxonomy level using a dissecting microscope. Samples were preserved in 70 percent ETOH following sorting. Sediment samples were frozen for further analysis.

(4) Data Analysis

Diversity index of macrobenthos (H') was calculated according to the following formula: $H' - \sum(P_i)(\log_2 P_i)$, in which P_i is the percentage of individual number of certain species in total individuals. Diversity index of macrobenthos was calculated using PRIMER. Maps were made using ArcGIS. Pie charts were made using MS EXCEL.

(5) Designation Reports

The designation reports for Xiaoyangkou wetland are prepared according to the national standards, such as "Selection technology guidelines of marine special protection areas (GB/T 25054-2010)", "Special marine protected area classification and grading standards (HY/T 117-2010)", and "Technical guidelines for the preparation of overall planning, function zoning in marine special protection areas (HY/T 118-2010)".

1.2 Field Visits

The visits with different stakeholders regarding Xiaoyangkou wetland are listed below:

(1) On May 8-10, 2017, Dr. Zhaohui Zhang, Mr. Shouqiang Wang, Dr. Fangyuan Qu and Ms. Shuyun Li from the First Institute of Oceanography (FIO) visited Xiaoyangkou

town. They met with the officers from the local government and discussed the details of the proposed protected area. After that, they visited the Xiaoyangkou National Marine Park and the proposed protected area. In this meeting, local government officials shared background information, the current situation and the importance of the wetland of Xiaoyangkou area to the researchers. We all agreed that, the Xiaoyangkou area is of vital importance of the survival of birds and other wetland lives, it need to be protected as a national level protected area. During the field visit, we had a general overview of the area, took pictures and set up the preliminary survey plan.

(2) On May 18-23, 2017, the researchers conducted a field survey on the Xiaoyangkou wetland. Mr. Shouqiang Wang, Mr. Shenghao Liu, Dr. Fangyuan Qu, Ms. Shuyun Li and Mr. Haidan Liu formed the survey team. During this field survey, the team got samples for species identification and sediment analysis. Figure 1.1 shows the field picture.

(3) During the field survey, they also met with resource persons on the spoon-billed sandpiper (SBS) in PR China to get the long-term bird watch record, and solicited their opinions on the proposed MPA.

(4) On August 28, 2017, a consultative meeting with local stakeholders was held by the Jiangsu Provincial Ocean and Fishery Bureau in Nanjing City. The team invited experts, local governmental officials, local stakeholders and people from FIO to discuss on the designation of the Xiaoyangkou MPA.

(5) On August 29-31, 2017, Rudong Ocean and Fishery officials came to Qingdao to further exchange ideas and opinions with FIO representatives.

(6) On August 31, 2017, Dr. Zhaohui Zhang met with people from the See Foundation to discuss on wetland bird protection.

(7) On December 12, 2017, a review meeting with national stakeholders was held in Beijing, PR China. The Review Committee consisting of nine experts from the Ministry of Environmental Protection (MEP), State Oceanic Administration (SOA) of PR China, National Marine Environmental Monitoring Centre (NMEMC) and other organizations reviewed the proposal for the designation of the MPA.

Figure 1.1 Project Team in field survey in Xiaoyangkou wetland.

2 Profile of Rudong coastal wetlands

2.1 Location and wetland condition

Rudong County is under the administration of Nantong City, Jiangsu Province, China, and lies on the Yellow Sea coast. The length of coastline of Rudong is about 106 km, total land area is 1,872.2 km^2, and total sea area is 4,758.23 km^2. The location of proposed protected area is shown in Figure 2.1.

Wetlands are important features in the landscape that provide numerous beneficial services for people and for fish and wildlife. Some of these services, or functions, include protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters and maintaining surface water flow during dry periods. Natural wetlands have been called the 'kidneys of the earth' because of their ability to store, assimilate

Figure 2.1 Location of proposed protected area.

Figure 2.2 Expansive wetland of Rudong.

and transform contaminants from land before they reach waterways. Like a giant kidney, wetlands help to dilute and filter materials that could otherwise harm the ocean. Wetlands are among the most productive ecosystems in the world, comparable to rainforests and coral reefs. An immense variety of species of microbes, plants, insects, amphibians, reptiles, birds, fishes and mammals can be part of a wetland ecosystem.

Wetlands can be thought of as "biological supermarkets." They provide great volumes of food that attract many animal species. These animals use wetlands for part of or all of their lifecycle. Dead plant leaves and stems break down in the water to form detritus, small particles of organic materials. This enriched material feeds many small aquatic insects, shellfishes and small fishes that are food for larger predatory fishes, reptiles, amphibians, birds and mammals. One of the well-known functions of wetlands is to provide a habitat for birds. Wetlands provide food for birds in the form of plants, vertebrates, and invertebrates. Wetland vegetation provides shelter from predators and the weather. The presence or absence of shelter may influence whether birds will inhabit a wetland or a nearby upland area.

Rudong County possesses great wetland resources (Figure 2.2). The total wetland area above 0 m in Rudong is 1.2 million mu (1 mu = 0.0667 hectare), equal to 1/9 of total wetland area of Jiangsu Province[1]. The Rudong wetland is growing slowly due to special geographic, geological and wave current conditions. The abundant food source and environment heterogeneity make Rudong wetland a good habitat of wildlife. According to recent data, Rudong wetland is known to have 148 species of higher plants, 150 species of higher animals.

2.2 Bird resources

Rudong wetland is critical to the survival of many migratory waterbird species using the East Asian-Australasian Flyway (EAAF), by providing staging and over-wintering habitats for migratory

waterbirds. During early winter, thousands of birds can be found in the Rudong area, either low-flying or searching for food in great numbers.

The expansive wetland of Rudong provides abundant food and habitat for migratory birds. According to a recent study conducted by the Institute of Geographical Sciences and Natural Resource Research of the Chinese Academy of Sciences (IGSNRR/CAS), 67 of the 110 priority sites (in accordance with the criteria of Ramsar and Important Bird Areas) lie outside protected areas, and some critical habitats for waterbirds are not covered under any type of protected area especially in Jiangsu. Xiaoyangkou wetland (under the administration of Rudong County) has an Irreplaceability Index of 523.05, the highest value among the wetlands studied, making the wetland the most important area for waterbird conservation in PR China. Many rare birds can be found in the proposed protected area, such as: red-crowned crane, white crane, white-headed crane and grey crane. About 30 species were listed as first and second class national protected animals of China. In Rudong area, the recorded first class national protected animals are: oriental white stork, relict gull, white crane and red-crowned crane. According to the IUCN Red List of Threatened Species (2015), some critically endangered species can be found in this area, such as: spoon-billed sandpiper, Baer's pochard and white crane. Some endangered species were also recorded, including oriental white stork, black-faced spoonbill, Nordmann's greenshank, red-crowned crane, eastern curlew and great knot. Figures 2.3 to 2.5 show some representative birds in the proposed protected area.

In the proposed protected area, the critically-endangered spoon-billed sandpiper (*Eurynorhynchus pygmeus*), a very rare migratory

Figure 2.3 Eastern Curlew

Figure 2.4 Greenshank

Figure 2.5 Little Stint

species which passes through Rudong area, draws much focus (Figure 2.6). In the past 30 years, this bird dropped 90 percent in number due to damage to its habitat. Currently, there are no more than 150 known pairs in the world. In October 2013, a bird survey recorded 143 spoon-billed sandpipers in the Xiaoyangkou area, which verifies it is an important transit area along its migratory route. Thus, the conservation of Xiaoyangkou wetland is emerging.

Figure 2.6 Spoon-billed Sandpiper

2.3 Macrobenthic resources

Marine benthic animals inhabit the sediment of coastal wetlands and seas. They are an important food source for the wetland birds and other animals. The team conducted a field survey in the Xiaoyangkou wetland and got the baseline information of macrobenthic animals.

In total, they sampled 24 species of macrobenthos (Figures 2.7 to 2.8). Polychaetes and molluscs had nine species respectively, followed by arthropoda with five species. One species belonged to brachiopoda. The number of species ranged from 2-10 species per sampling site.

Average biomass of macrobenthos was 8.22 g/m^2, ranging from 0.368 g/m^2 to 55.04 g/m^2. Molluscs dominated the biomass, accounting for 87 percent of the total biomass, followed by the polychaetes, with 10 percent of the total biomass.

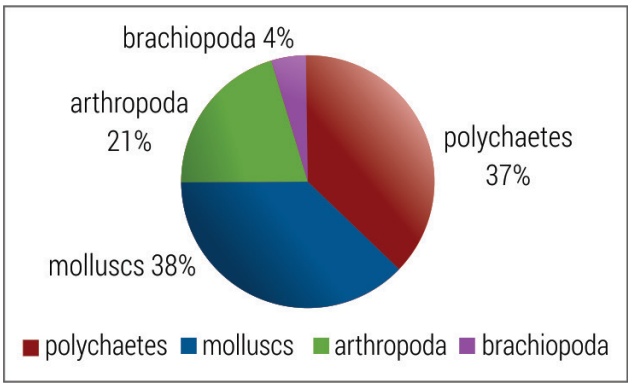


Figure 2.7 Macrobenthic species composition in Xiaoyangkou wetland.

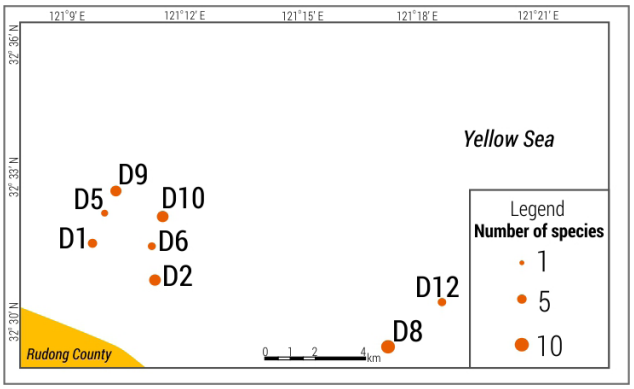


Figure 2.8 Number of macrobenthic species distribution in Xiaoyangkou wetland

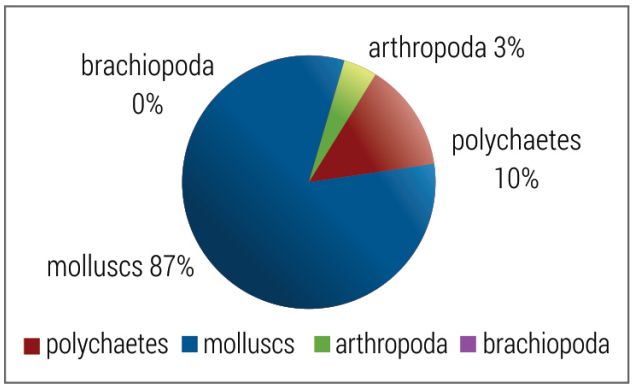


Figure 2.9 Macrobenthic biomass composition of Xiaoyangkou wetland.

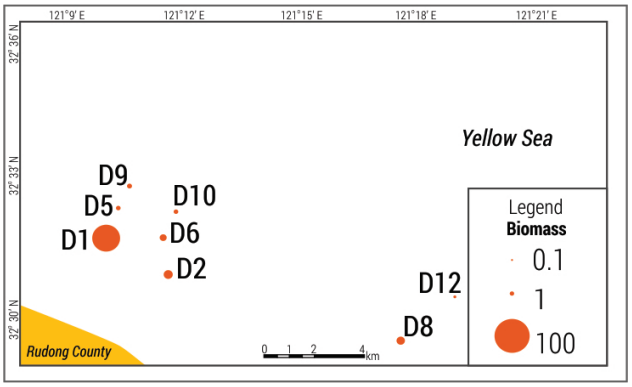


Figure 2.10 Macrobenthic biomass distribution in Xiaoyangkou wetland.

Average abundance was 744 individuals/m^2 ranging from 144 individuals/m^2 to 2,624 individuals/m^2 Molluscs dominated the abundance as well, accounting for 72 percent of the total abundance. Polychaetes was the second highest group, accounting for 21 percent of the total abundance.

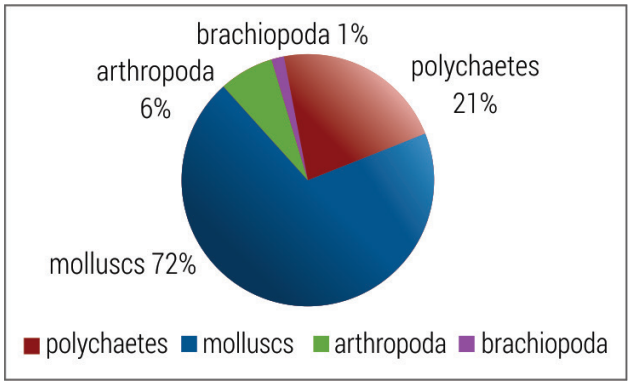


Figure 2.11 Macrobenthic abundance composition in Xiaoyangkou wetland.

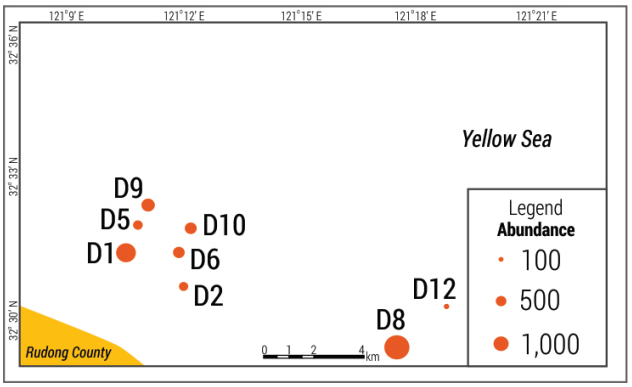


Figure 2.12 Macrobenthic abundance distribution in Xiaoyangkou wetland.

Average macrobenthic biodiversity index in Xiaoyangkou wetland was 1.57, ranging from 0.39 to 2.92.

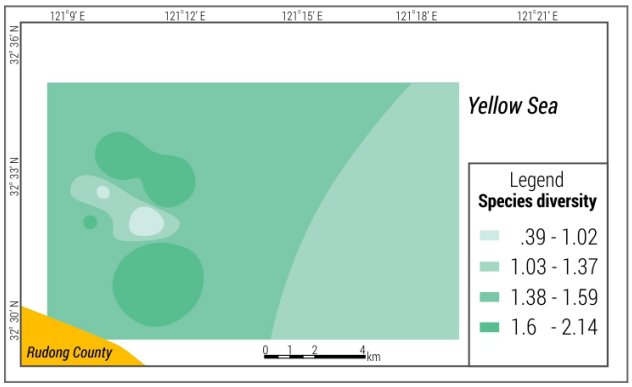


Figure 2.13 Macrobenthic diversity index distribution in Xiaoyangkou wetland.

2.4 Socioeconomic condition

The overall economic development is stable of Rudong County. In 2016, Rudong County reached a GDP of RMB 74,669 million, 9.2 percent more than the previous year (2015). GDP per capital is RMB 76,046. Urban residents' disposable income in 2016 was RMB 37,133.3, 8.1 percent more than 2015. Rural residents' disposable income in 2016 was RMB 17,118.8, 8.2 percent more than in 2015. The economic competitiveness of Rudong County is proven as it was in the Top 100 Chinese Counties for 13 consecutive years.

In 2016, total output value of farming, forestry, animal husbandry, and fishery was RMB 13,988 million. The output value of farming and forestry, animal husbandry, and fishery was RMB 4,652 million, RMB 3,335 million, and RMB 5,007 million respectively.

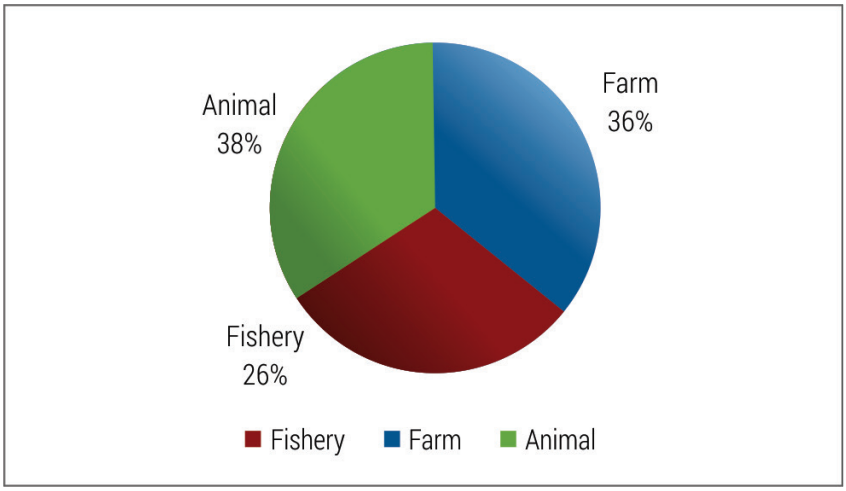


Figure 2.14 Percentage of different industry in Rudong County.

The biggest offshore wind power project in Asia was completed and put into production in Rudong wetland in September 2017. The total investment is RMB 5,300 million, total installed capacity is 300 MW. With the complete operation of this project, the annual total electric energy production will be 0.082 billion kilowatt-hour (kWh), saving 240,000 tons of coal, reducing 500,000 tons of CO_2 emissions.

In 2016, 3.4 million domestic and foreign tourists visited Rudong County, the total income of the tourist industry was RMB 4,342 million. Rudong had nine starred hotels, six travel agencies and five A-grade scenic spots.

Rudong had 91 high-tech enterprises. Three scientific and technological achievement got the award for scientific and technological advancement in Jiangsu Province in 2016. Rudong had one secondary vocational school, with 4,011 students, 4 high schools, with 8,581 students.

In 2016, new urban public green area was 300,000 m^2, urban green coverage rate was 42.7 percent. Water quality and drinking water source quality were all qualified. In 253 days, air quality index reached good condition.

Rudong is an important ocean county of Jiangsu Province. It has 3 fishing ports, 1,298 all kinds of fishing boats, 1,400 tractors for wetland transportation, and 10,000 people involved in fishing industry. Economic development of Rudong fishing industry is stable. Total fishery production was 305,600 tons. Aquaculture area was 57,500 hectares, in which 4.85 was marine culture. Gross fishery output was RMB 15,349 million, 3.1 percent more than last year.

2.5 Related zoning plans

China, as the largest developing country, has experienced ecological degradation largely driven by an imbalance between high population and economic growth pressures as well as limited natural resource reserves and environmental capacity. The widespread ecological degradation has raised serious concerns from both the Chinese government and the general public. As a result, the Chinese government has launched several large-scale ecological rehabilitation and conservation programs since the late 1990s. With the promotion of these programs, China is becoming a greening nation. Greening here refers to the process of ecosystem restoration as measured by the increasing greenness of

land cover. The extended meaning of greening is the overall improvement of the ecological and environmental qualities of a region.

Along with the greening trend, a paradigm of redlining in natural resource and ecosystem management has emerged. Redlining is the planning for natural resource use and conservation with certain targeting constraints, such as the lowest level of a natural resource or ecosystem reserve that needs to be preserved. As of early 2017, 11 coastal provinces have finished the eco-redline zone designation. More than 30 percent of sea areas under national jurisdiction of China and more than 35 percent mainland coastal line were included in the redline control area. The proposed protected area is in accordance with the current status in China, where improvement of the marine environment and enlarging the MPA area are the main aims until 2020 according to the national marine functional zoning plan (2011-2020). The Jiangsu Province marine functional zoning plan (2011-2020) also specified the six main aims until 2020: (1) improve marine environment conditions; (2) enlarge MPA areas; (3) control main pollutants discharges; (4) improve key polluted areas environmental quality; (5) control ecological degradation trends in some sea areas; and (6) restore some damaged marine ecosystems. Until 2020, the MPA area will reach 11 percent of the total jurisdictional sea area of Jiangsu Province.

According to the Jiangsu Province Marine Eco-redline protection plan (2016-2020), the proposed protected area is located in the area designated as "Rudong important coastal eco-wetland area"(Figure 2.15).

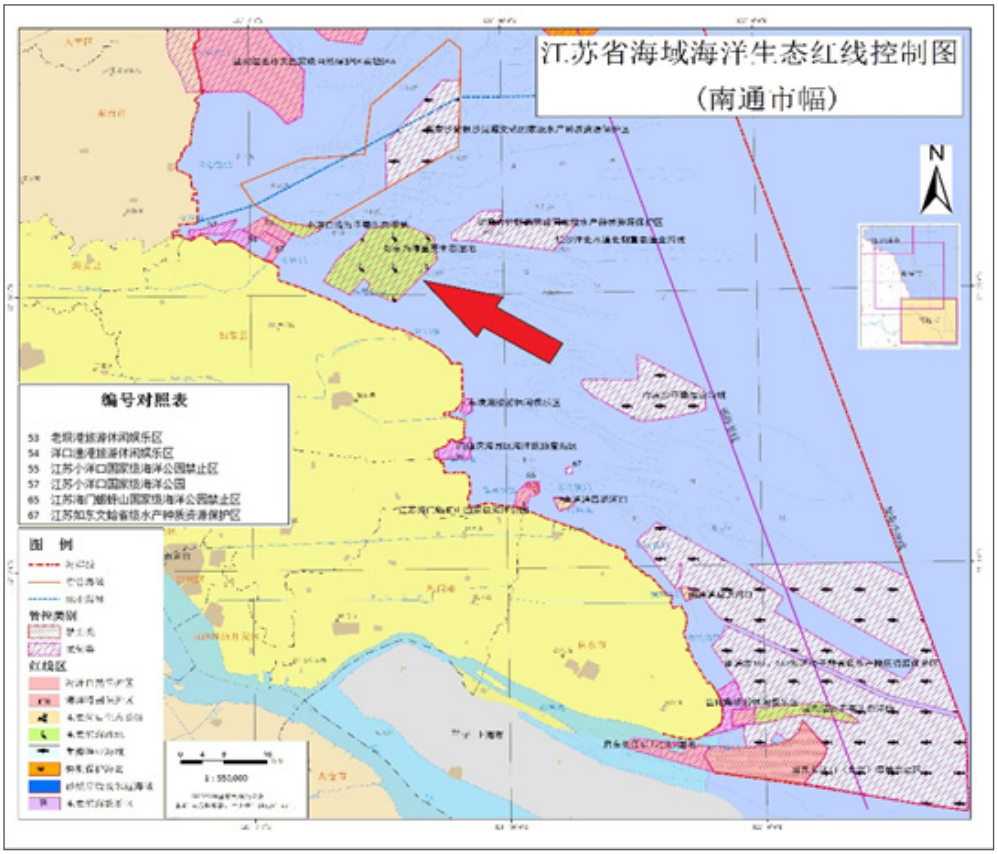


Figure 2.15 Jiangsu Province marine eco-redline plan (for Nantong City). The red arrow points to the "Rudong important coastal eco-wetland area", where the proposed MPA is located.

2.6 Potential protected target and area

As described above, the potential protected targets are wetland ecosystems, and rare and endangered birds.

The IGSNRR/CAS studied the bird conservation priority area of China, and listed Xiaoyangkou wetland as the most important area of China waterbird conservation. At the same time, the current zoning plan needs to be taken into consideration as well. The result will make the final protected area a good combination of zoning and conservation.

Figure 2.16 Rudong wetland ecosystem.

3 Threats and constraints

3.1 Threats

(1) Sea reclamation

Sea reclamation has a long history in Nantong City, which can be traced back to the Song Dynasty. Sea reclamation is a very important way to increase land resources for Nantong, whose per capita cultivated land is smallest in Jiangsu Province. Thus, reclamation plays an important role in relieving the stress in land area shortage, and promoting Nantong economic development.

There are three stages in the recent history of Nantong sea reclamation. The first stage (1950 to 1994) used the wetland to develop agriculture and animal husbandry. The second stage (1995 to 2008), saw mariculture flourishing. The third stage (2009 to the present), focused on the construction and development of the coastal harbor. In total, 850,100 mu of wetlands were reclaimed from 1950 to 2012.

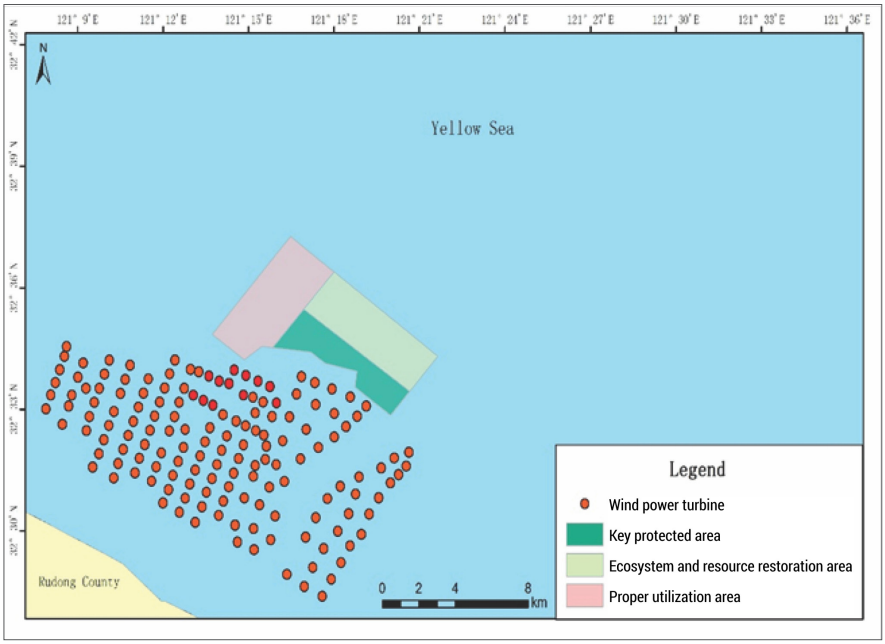
Sea reclamation is the main threat of wetland conservation in Nantong City. The main cause of habitat loss has been land reclamation, especially in estuaries and shallow bays. Coastal mudflat reclamation has been mainly for expansion of aquaculture and mariculture, building houses, apartments and industrial areas. Approximately 880,000 ha of Yellow Sea mudflat areas have been reclaimed. This comprises 37 percent of the inter-tidal areas of the Chinese portion of the Yellow Sea, which have been reclaimed since 1950. The main effect of habitat loss is on the composition of assemblages of organism communities in tidal mudflats, especially benthic organisms, waterbirds and reduced resting and feeding grounds for migratory birds.

(2) Wind power turbines

There are hundreds of wind power turbines scattered on the Xiaoyangkou wetland. The giant blades of wind power turbines are moved by the natural sea winds, generating a huge amount of electric power. The biggest offshore wind power project in Asia was completed and put into production in Rudong wetland in September 2017. The total investment is RMB 5,300 million, total installed capacity is 300 MW. With the complete operation of this project, the annual total electric energy production will be 0.082 billion kilowatt-hour (kWh), saving 240,000 of tons of coal, reducing 500,000 tons of CO_2 emissions.

But the fast-turning blades can injure or even kill the wetland birds flying across it. There are extensive reports on avian mortality due to the collision with wind turbines. Collision mortality can adversely affect bird population. The wind power turbines near the MPA are shown in Figure 3.1. There are no wind power turbines inside the proposed MPA area at present.

Figure 3.1 Wind power turbines distribution near the proposed MPA.



3.2 Constraints

(1) The dilemma between reduction on source of income of local fishers and the needed marine resource protection

Some local residents, whose income come from fishing and catching other marine animals, will find that their income will be affected once the fishing restrictions are in place.

Due to the decline of the fishing population, China has always been encouraging the fishers to shift to other businesses, such as mariculture, aquatic production processing and recreational fishery. Many training workshops have been held to help fishers learn new knowledges and skills. Subsidies were also given to fishers for reduction of the number of fishing boats.

(2) Lack of funding for MPA construction

The MPA construction is a social and public service activity to a great extent. The funding should mainly come from country and society. Funds are used in the following aspects: raising management capacity, infrastructure construction, scientific monitoring, and public awareness and education. Currently, few funding goes into marine ecological construction, leading to severe deficiency in infrastructures and environmental protection equipment. Generally, the infrastructures in an MPA include: boundary marker, bulletin board, monitoring equipment, road sign, advertising board, entrance sign, management office room, lab, tourist center, et al.

(3) Deficient marine scientific research

Marine science development in Rudong is weak and deficient. There is no marine science institution. There is a need for more scientific expertise. Some technical problems that emerged during the protection process could not be solved. Generally, people working in MPAs don't have technical skills, such as how to identify marine species sampled in MPAs, how to analyze data collected, and how to use and maintain sampling equipment. Without enough scientific know-how, some problems are difficult to solve properly, such as how to raise management effectiveness of MPAs, how to cope with emergency hazards in MPAs, and how to elevate the ecological connectivity among MPA.

4 Objectives

4.1 Short-term objectives (2017-2020)

Table 4.1 Short-term objectives (2017-2020) of the protected area.

Item		Short-term objectives
Protect objectives		Effective protection on wetland ecosystem and birds.
Organization and personnel		Initiate the management organization, formulate cooperation and supervision system, hire management staff.
Infrastructure		Finish most of the infrastructures for management, protection, monitoring, propagation, tourism, and office.
Sustainable funding		Part of the funding comes from eco-industry, most of the funding comes from government financial support.
Development objectives of eco-industry		Sightseeing and leisure region is built and opened to public.
Management activities	**Protection**	Complete routine patrol system and put into effects, draft management rule and regulation and put into effects, enhance supervision and law enforcement capacity, realize digital archive management, reach protected area eco-management, enhance emergency management capacity and disaster prevention capacity.
	Development and utilization	Preliminary plan and management mechanism for development and utilization activity. Eco-industry develops healthily. Earnings increase stably.
	Scientific monitoring	Preliminarily build the scientific monitoring system, conduct survey on resource and environment, preliminarily conduct dynamic monitoring, monitor human disturbance in and near MPA.
	Eco-restoration	Formulate detailed coastal wetland protection and restoration plan and put into effects.
	Propaganda	Routinely hold propaganda activity to raise public awareness.
	Community co-management	Build co-management measures, attract local residents to join the co-management, organize some community co-management activities.
Social development objectives		Raised awareness of marine environment protection, local residents and tourists can feel the benefit of environment protection.
Economic development objectives		Increase job opportunities and income for local residents, improve local residents' quality of life.

4.2 Long-term objectives (2021-2025)

Table 4.2 Long-term objectives (2021-2025) of the protected area.

Item		Long-term objectives
Protect objectives		Biodiversity inside the MPA increased.
Organization and personnel		The management organization is rational and efficient, build cooperation and supervision system, hire enough management staff.
Infrastructure		Finish all of the infrastructures for management, protection, monitoring, propagation, tourism, and office.
Sustainable funding		Self-funding
Development objectives of eco-industry		Finish construction of each functional zone according to the master plan.
Management activities	**Protection**	Complete management rule and regulation and put into effects, conduct rational and efficient management. Realize digital archive management, and eco-management. Build complete management system.
	Development and utilization	Complete plan and management mechanism for development and utilization activity. Eco-industry develops healthily. Earnings increase stably.
	Scientific monitoring	Complete the scientific monitoring system, conduct dynamic monitoring. Scientific activity thrives. Monitor activity develop stably.
	Eco-restoration	Conduct resource restoration activities. Coastal wetland ecosystems get effective protection.
	Propaganda	Comprehensive propaganda activity will be held to raise public awareness.
	Community co-management	Local residents actively join the co-management activities.
Social development objectives		Strong awareness of marine environment protection, local residents consciously participate into protection activities.
Economic development objectives		Development of eco-industry raises the living standard of local residents, promote the economic development of Rudong.

5 Designation

Considering the importance of the Xiaoyangkou wetland ecosystem stated above, Xiaoyangkou wetland should be designated as an MPA to ensure its function. Figure 5.1 shows the proposed protected area. The total area is 4,260.0 hectares, of which Key Protected Area is 1,030.85 hectares, Ecosystem and Resource Restoration Area is 1,554.28 hectares and Proper Utilization Area is 1,674.94 hectares. Table 5.1 has the longitude and latitude of each boundary points. The protection objects are wetland ecosystem and endangered birds.

In the Key Protected Area, strict protect measure is carried out. Activities that are harmful to the key protected area are barred. Construction is not allowed in this area except construction for MPA protection, which can only be carried out with public hearing or other public participation activities, and a permit from the Jiangsu Ocean and Fishery Ministry.

In the Ecosystem and Resource Restoration Area, human disturbance is strictly controlled. Construction is also restricted in this area. Proper artificial ecological renovation and restoration are adopted to recover marine environment and critical habitats.

In the Proper Utilization Area, resource utilization projects in accordance with the protection aim of MPAs are allowed. Eco-tourism, eco-aquaculture, recreational fishery, harmless scientific study are also allowed.

Figure 5.1 Proposed protected area location and functional zones.

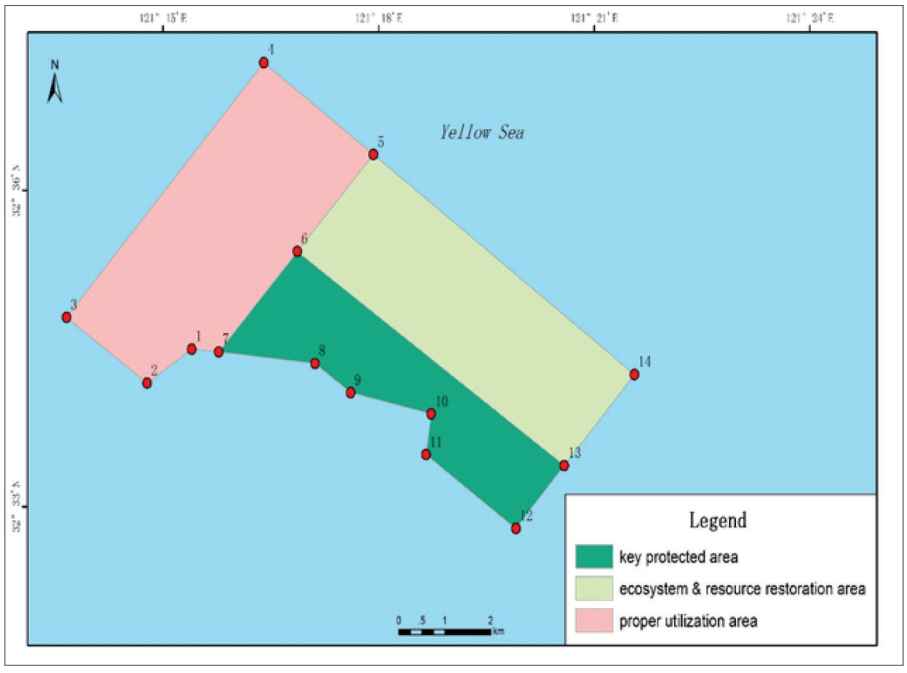


Table 5.1 Coordinates of each boundary points.

points	Longitude	Latitude
1	121° 15' 21.064" E	32° 34' 28.337" N
2	121° 14' 43.604" E	32° 34' 09.317" N
3	121° 13' 36.932" E	32° 34' 47.397" N
4	121° 16' 23.552" E	32° 37' 10.940" N
5	121° 17' 54.529" E	32° 36' 17.536" N
6	121° 16' 50.132" E	32° 35' 22.953" N
7	121° 15' 43.574" E	32° 34' 26.508" N
8	121° 17' 04.036" E	32° 34' 19.130" N
9	121° 17' 33.434" E	32° 34' 02.177" N
10	121° 18' 40.541" E	32° 33' 49.312" N
11	121° 18' 35.735" E	32° 33' 26.239" N
12	121° 19' 50.247" E	32° 32' 43.451" N
13	121° 20' 31.083" E	32° 33' 18.750" N
14	121° 21' 30.460" E	32° 34' 10.067" N

Table 5.2 Range, area and percentage of each functional zone.

Functional zone	Range	Area	Percentage
Key Protected Area	6-7-8-9-10-11-12-13-6	1,030.85	24.2%
Ecosystem and Resource Restoration Area	5-6-13-14-5	1,554.28	36.5%
Proper Utilization Area	1-2-3-4-5-6-7-1	1,674.94	39.3%
Total area		4,260.07	100%

6 Management and stakeholder participation

6.1 Identify stakeholders

The stakeholders of the proposed protected area can be classified as the following:

(1) Community composed of local residents. Residents who live in the proposed protected area, possess and use the natural resources in it.
(2) Local communities who have a direct-interest relationship with the resource management of the protected area, such as related enterprises staff and village committee.
(3) Commercial users of resources in the area. The relationship between this kind of stakeholder and the resource is purely commercial.
(4) Supporters of this protected area, such as an environmental protection group, community, and individuals.
(5) End users of the production of the protected area.
(6) Management agencies of the protected area, such as marine, fishery, and tourism departments.

According to the information above, in Xiaoyangkou area, the stakeholders should be: local residents near the MPA area, who use the natural resources of it, the offshore wind power enterprise, tourism companies, birdwatch groups, and government agencies, such as the Rudong County Ocean and Fishery Bureau.

6.2 Community co-management

Community co-management welcomes the local community and stakeholders to actively participate in the maintenance and management of the protected area. The main aim of this mechanism is to combine biodiversity conservation with sustainable development of the community. Local communities have responsibilities in the plan and utilization of the MPA. The local community sustainably use resources in the MPA in accordance with the biodiversity conservation aim. Meanwhile, the government trusts the ability of the local community and provides necessary support and help. While using the resources, the local community provides itself with the opportunity for resource management. It regulates its responsibility, specifies its need, aim and wish, understands its current activity is related to its future well-being. Thus, it consciously becomes the manager, protector and maintainer.

Community co-management contains the following aspects:

(1) Join in the compilation of regulations regarding protection of MPA, animals, plant, and environment, and co-execution.
(2) Join the learning and training of the management system for the MPA and the propaganda/public awareness activities of the MPA.
(3) Conduct environment monitoring, analyze data, and propose appropriate advice.
(4) Join the updating of the management plan.

6.3 Management system of proposed protected area

Building an MPA comprehensive coordinating and management system that is multisectoral to decide on the compressive management of protected

areas is convenient for unified arrangements and implementation of management actions.

The main parts of this management system are: MPA comprehensive management committee, experts consulting committee and comprehensive management department (Figure 6.1).

(1) MPA comprehensive management committee

The construction of this protected area involves several different sections, such as: marine and fishery; tourism; land and resources; environment protection; construction; transportation; water-conservancy; and forestry and agriculture. Thus, it poses a challenge in coordination. For the prompt implementation of protected areas, the local government should build a management committee with the deputy mayor as committee leader; ocean and fishery bureau head as the deputy committee leader; along with other related participating agencies. Thus, to unify the coordination of the management plan, there is a need to obtain support from all related agencies, and promote the construction and management of the protected area.

(2) Experts consulting committee

The Management committee will employ domestic and foreign experts on marine, tourism, wetlands, ecology, plants, animals and water-conservancy to build the experts consulting committee, which is in charge of the technical consultation and discussion of certain problems during the construction and management of the MPA.

(3) Comprehensive management department

This management department will be in charge of the management work of this protected area. It has four different sections: office, management and protection, finance, and technical. The main responsibilities of this department are ecosystem resource protection, scientific monitoring, popularization of science, and administrative affairs. Fund for this department comes from the local government.

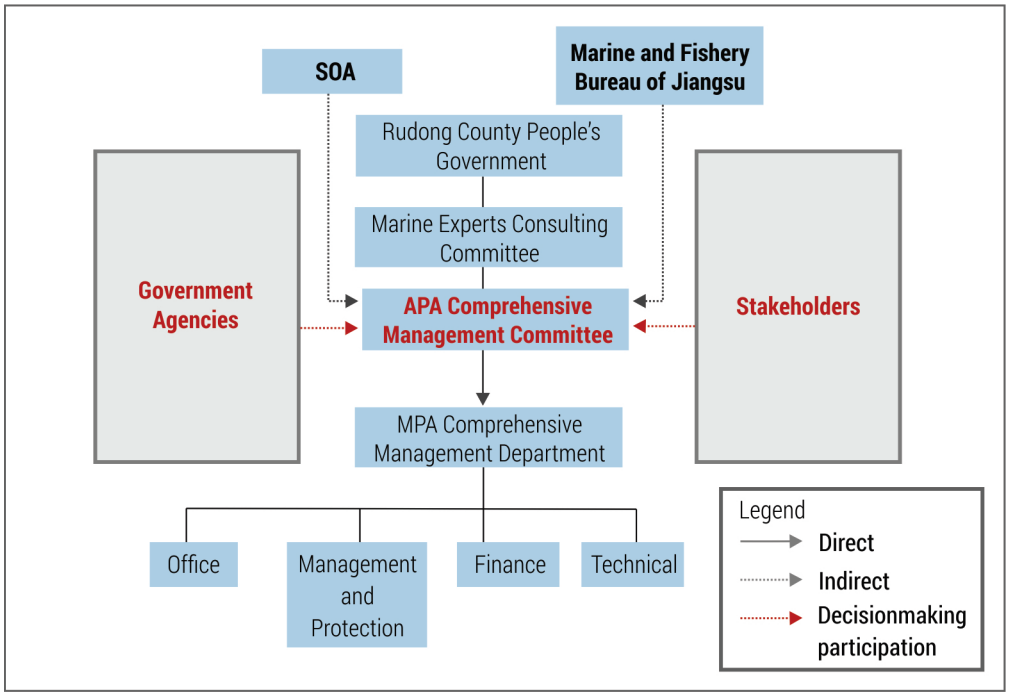


Figure 6.1 Management system of proposed protected area.

7 Monitoring and funding

7.1 Scientific monitoring plan

The aim of scientific monitoring in the MPA is to provide scientific basis for effective management.

The monitoring plan includes the following aspects:

(1) Biological and environmental surveys

Conduct systematic surveys every five years, including natural environment factors, wetlands, coastal wetland plants, biodiversity, bird diversity, socioeconomic condition et al.

(2) Coastal wetland restoration research

According to the survey results, find out the causes of wetland degradation, compile a wetland restoration plan, and conduct an assessment of wetland restoration effects.

(3) Dynamic monitoring on population and habitat

Monitoring the dynamic change of population and habitat are important basis of formulation of management plan and evaluation of management effectiveness. It is planned as the following:

a. Dynamic monitoring on coastal wetland ecological evolution, including: reed-suaeda-eel grass ecological evolution process, Spartina alterniflora bio-invasion evolutional process;
b. Wildlife monitoring, including bird, nekton, benthos, planktons, et al.;
c. Environmental factors monitoring: water quality, sediments;
d. Dynamic monitoring on local community conditions;
e. Human disturbance monitoring: pollution levels, aquaculture and fishing; and
f. Disaster monitoring: green tides, red tides and storm surge.

(4) MPA management effectiveness and development

Studies on the management actions, and management effectiveness are important to the sustainable development of the MPA. This section includes the following aspects:

a. GIS-based database and information management system construction;
b. Study and evaluation of sustainable management of eco-industries inside the MPA;
c. MPA management and protection system;
d. Environmental press brought by economic activities of the community and nearby areas; and
e. Eco-tourism effectiveness study and evaluation.

7.2 Investment budget

The funding for the construction of the protected area includes two parts: infrastructure and operating expenses.

(1) Infrastructure

Funding for infrastructure is about RMB 16 million. The detailed budget is displayed in Table 7.1.

Table 7.1 Budget for infrastructure.

Item	Budget (RMB million)
Management office	4
Monitoring station, Offshore management platform	2
Personnel training	0.2
Ecological monitoring instruments	6.8
Signs, Boundary markers	1
Fingerlings for enhancement	0.5
Car and Ship	0.5
Facilities	0.3
Management expenses	0.5
Other expenses	0.2
TOTAL	**16.0**

(2) Operating expenses

Considering the structure of the management system for the proposed protected area and local economic conditions, the annual operating expenses is estimated at RMB 0.3 million.

(3) Funding sources

The funding for infrastructure is about RMB 16 million, which will come from national, provincial and municipal financial allocations, and protected area self-finance. Operating expenses should be listed into the local government annual financial budget. Jiangsu and Rudong people's government should arrange specific funding for MPA construction, invite investments, and try to apply for the funding from domestic and foreign ecological protection organizations. Eco-tourism can also bring money to help in conserving and restoring the marine ecosystem of the MPA.

8 Summary and Recommendations

8.1 Summary

The proposed Xiaoyangkou National Marine Protected Area is located in Rudong County, Nantong City, Jiangsu Province. The total area is 4,260.07 hectares, in which the key protected area is 1,030.85 hectares, ecosystem and resource restoration area is 1,554.28 hectares and proper utilization area is 1,674.94 hectares. The protection of the MPA includes protecting the coastal wetland ecosystem and endangered birds. Wetlands are important features in the landscape that provide numerous beneficial services for people, fishes and wildlife. These services, or functions, include protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters and maintaining surface water flow during dry periods. Natural wetlands have been called the 'kidneys of the earth' because of their ability to store, assimilate and transform contaminants from land before they reach waterways. Wetlands are among the most productive ecosystems in the world, comparable to rain forests and coral reefs. Wetlands can be thought of as "biological supermarkets". They provide great volumes of food that attract many animal species. These animals use wetlands for part of or all of their lifecycle. One of the well-known functions of wetlands is to provide a habitat for birds.

Rudong wetland is critical to the survival of many migratory waterbird species using the East Asian-Australasian Flyway (EAAF), by providing staging and over-wintering habitats for migratory waterbirds. Xiaoyangkou wetland is the most important habitat for waterbirds in China according to a recent study conducted by the Institute of Geographical Sciences and Natural Resource Research of the Chinese Academy of Sciences. The study found that 67 of the 110 priority sites in accordance with the criteria of Ramsar and Important Bird Areas lie outside protected areas, and some critical habitats for waterbirds are not covered in any type of protected area especially in Jiangsu. Xiaoyangkou wetland has an Irreplaceability Index of 523.05, which is the highest value among wetlands studied. So the Xiaoyangkou wetland is the most important area of waterbirds conservation in China. Many rare birds can be found in the proposed protected area, such as: red-crowned crane, white crane, white-headed crane and grey crane. About 30 species were listed as first and second class national protected animals of China. In Rudong area, the recorded first-class national protected animals are: oriental white stork, relict gull, white crane and red-crowned crane. According to the IUCN Red List of Threatened Species 2015, some critically endangered species can be found in this area, such as: spoon-billed sandpiper, Baer's Pochard and white crane. Also, some endangered species were recorded in this area: oriental white stork, black-faced spoonbill, Nordmann's greenshank, red-crowned crane, eastern curlew and great knot. Currently, about 370 birds have been recorded in the Xiaoyangkou area.

Thus, the foundation of the Xiaoyangkou National Marine Protected Area is of vital importance to the marine environment protection and the promotion of marine eco-civilization construction.

8.2 Recommendations

Related government departments should provide more support to MPA in terms of law, regulations, funding, management et al. to promote the effective conservation effects of MPA, prosperous life and good ecological environment in Rudong area.

After the approval of the Xiaoyangkou protected area, management department should compile a master plan. The construction department should conduct construction activities according to the master plan. Experiences should be collected, and proper modification of the master plan can be applied.

Related departments should strengthen the scientific monitoring inside the protected area to ensure the protection effects, changes and benefits.

References

People's Government of Jiangsu Province. N.d. Jiangsu Province marine functional zoning plan (2011-2020).

People's Government of Jiangsu Province. N.d. Jiangsu Province Marine Eco-redline protection plan (2016-2020).

People's Government of Rudong County. 2016a. Rudong, the 13th five-year plan on environmental protection.

People's Government of Rudong County. 2016b. Rudong, the 13th five-year plan on national economy and social development.

People's Government of Rudong County. 2017. 2017 Rudong County People's Government work report.

State Council of the People's Republic of China. N.d. National marine functional zoning plan (2011-2020).

Appendix 1: The namelist of waterbirds in Rudong wetlands

序号	中文名	英文名	拉丁文	目	科	属	归类
0001	栗树鸭	Lesser Whistling Duck	*Dendrocygna javanica*	雁形目	鸭科	树鸭属	雁鸭类
0002	白头硬尾鸭	White-headed Duck	*Oxyura leucocephala*	雁形目	鸭科	硬尾鸭属	雁鸭类
0003	疣鼻天鹅	Mute Swan	*Cygnus olor*	雁形目	鸭科	天鹅属	雁鸭类
0004	大天鹅	Whooper Swan	*Cygnus cygnus*	雁形目	鸭科	天鹅属	雁鸭类
0005	小天鹅	Tundra Swan	*Cygnus columbianus*	雁形目	鸭科	天鹅属	雁鸭类
0006	鸿雁	Swan Goose	*Anser cygnoides*	雁形目	鸭科	雁属	雁鸭类
0007	豆雁	Bean Goose	*Anser fabalis*	雁形目	鸭科	雁属	雁鸭类
0008	白额雁	Greater White-fronted Goose	*Anser albifrons*	雁形目	鸭科	雁属	雁鸭类
0009	小白额雁	Lesser White-fronted Goose	*Anser erythropus*	雁形目	鸭科	雁属	雁鸭类
0010	灰雁	Greylag Goose	*Anser anser*	雁形目	鸭科	雁属	雁鸭类
0011	斑头雁	Bar-headed Goose	*Anser indicus*	雁形目	鸭科	雁属	雁鸭类
0012	雪雁	Snow Goose	*Chen caerulescens*	雁形目	鸭科	雁属	雁鸭类
0013	加拿大雁	Cackling Goose	*Branta hutchinsii*	雁形目	鸭科	黑雁属	雁鸭类
0014	黑雁	Brent Goose	*Branta bernicla*	雁形目	鸭科	黑雁属	雁鸭类
0015	红胸黑雁	Red-breasted Goose	*Branta ruficollis*	雁形目	鸭科	黑雁属	雁鸭类
0016	赤麻鸭	Ruddy Shelduck	*Tadorna ferruginea*	雁形目	鸭科	麻鸭属	雁鸭类
0017	冠麻鸭	Crested Shelduck	*Tadorna cristata*	雁形目	鸭科	麻鸭属	雁鸭类
0018	翘鼻麻鸭	Common Shelduck	*Tadorna tadorna*	雁形目	鸭科	麻鸭属	雁鸭类
0019	瘤鸭	Comb Duck	*Sarkidiornis melanotos*	雁形目	鸭科	瘤鸭属	雁鸭类
0020	棉凫	Cotton Pygmy Goose	*Nettapus coromandelianus*	雁形目	鸭科	棉凫属	雁鸭类
0021	鸳鸯	Mandarin Duck	*Aix galericulata*	雁形目	鸭科	鸳鸯属	雁鸭类
0022	赤膀鸭	Gadwall	*Anas strepera*	雁形目	鸭科	[河]鸭属	雁鸭类
0023	罗纹鸭	Falcated Duck	*Anas falcata*	雁形目	鸭科	[河]鸭属	雁鸭类
0024	赤颈鸭	Eurasian Wigeon	*Anas penelope*	雁形目	鸭科	[河]鸭属	雁鸭类
0025	葡萄胸鸭	American Wigeon	*Anas americana*	雁形目	鸭科	[河]鸭属	雁鸭类
0026	绿头鸭	Mallard	*Anas platyrhynchos*	雁形目	鸭科	[河]鸭属	雁鸭类
0027	斑嘴鸭	Spot-billed Duck	*Anas poecilorhyncha*	雁形目	鸭科	[河]鸭属	雁鸭类
0028	棕颈鸭	Philippine Duck	*Anas luzonica*	雁形目	鸭科	[河]鸭属	雁鸭类
0029	琵嘴鸭	Nothern Shoveller	*Anas clypeata*	雁形目	鸭科	[河]鸭属	雁鸭类
0030	针尾鸭	Nothern Pintail	*Anas acuta*	雁形目	鸭科	[河]鸭属	雁鸭类

序号	中文名	英文名	拉丁文	目	科	属	归类
0031	白眉鸭	Garganey	*Anas querquedula*	雁形目	鸭科	[河]鸭属	雁鸭类
0032	花脸鸭	Baikal Teal	*Anas formosa*	雁形目	鸭科	[河]鸭属	雁鸭类
0033	绿翅鸭	Eurasian Teal	*Anas crecca*	雁形目	鸭科	[河]鸭属	雁鸭类
0034	美洲绿翅鸭	Green-winged Teal	*Anas carolinensis*	雁形目	鸭科	[河]鸭属	雁鸭类
0035	云石斑鸭	Marbled Teal	*Marmaronetta angustirostris*	雁形目	鸭科	云石斑鸭属	雁鸭类
0036	赤嘴潜鸭	Red-crested Pochard	*Netta rufina*	雁形目	鸭科	狭嘴潜鸭属	雁鸭类
0037	红头潜鸭	Common Pochard	*Aythya ferina*	雁形目	鸭科	潜鸭属	雁鸭类
0038	帆背潜鸭	Canvasback	*Aythya valisineria*	雁形目	鸭科	潜鸭属	雁鸭类
0039	白眼潜鸭	Ferruginous Pochard	*Aythya nyroca*	雁形目	鸭科	潜鸭属	雁鸭类
0040	青头潜鸭	Baer's Pochard	*Aythya baeri*	雁形目	鸭科	潜鸭属	雁鸭类
0041	凤头潜鸭	Tufted Duck	*Aythya fuligula*	雁形目	鸭科	潜鸭属	雁鸭类
0042	斑背潜鸭	Greater Scaup	*Aythya marila*	雁形目	鸭科	潜鸭属	雁鸭类
0043	小绒鸭	Steller's Eider	*Polysticta stelleri*	雁形目	鸭科	小绒鸭属	雁鸭类
0044	丑鸭	Harlequin Duck	*Histrionicus histrionicus*	雁形目	鸭科	丑鸭属	雁鸭类
0045	长尾鸭	Long-tailed Duck	*Clangula hyemalis*	雁形目	鸭科	长尾鸭属	雁鸭类
0046	黑海番鸭	Black Scoter	*Melanitta nigra*	雁形目	鸭科	海番鸭属	雁鸭类
0047	斑脸海番鸭	White-winged Scoter	*Melanitta fusca*	雁形目	鸭科	海番鸭属	雁鸭类
0048	鹊鸭	Common Goldeneye	*Bucephala clangula*	雁形目	鸭科	鹊鸭属	雁鸭类
0049	白秋沙鸭	Smew	*Mergellus albellus*	雁形目	鸭科	白秋沙鸭属	雁鸭类
0050	红胸秋沙鸭	Red-breasted Merganser	*Mergus serrator*	雁形目	鸭科	秋沙鸭属	雁鸭类
0051	中华秋沙鸭	Scaly-sided Merganser	*Mergus squamatus*	雁形目	鸭科	秋沙鸭属	雁鸭类
0052	普通秋沙鸭	Common Merganser	*Mergus merganser*	雁形目	鸭科	秋沙鸭属	雁鸭类
0053	小鸨	Little Bustard	*Tetrax tetrax*	鹤形目	鸨科	小鸨属	鹤鹳类
0054	大鸨	Great Bustard	*Otis tarda*	鹤形目	鸨科	鸨属	鹤鹳类
0055	波斑鸨	Macqueen's Bustard	*Chlamydotis macqueenii*	鹤形目	鸨科	波斑鸨属	鹤鹳类
0056	白鹤	Siberian Crane	*Grus leucogeranus*	鹤形目	鹤科	鹤属	鹤鹳类
0057	赤颈鹤	Sarus Crane	*Grus antigone*	鹤形目	鹤科	鹤属	鹤鹳类
0058	白枕鹤	White-naped Crane	*Grus vipio*	鹤形目	鹤科	鹤属	鹤鹳类
0059	沙丘鹤	Sandhill Crane	*Grus canadensis*	鹤形目	鹤科	鹤属	鹤鹳类
0060	蓑羽鹤	Demoiselle Crane	*Grus virgo*	鹤形目	鹤科	鹤属	鹤鹳类

序号	中文名	英文名	拉丁文	目	科	属	归类
0061	灰鹤	Common Crane	*Grus grus*	鹤形目	鹤科	鹤属	鹤鹳类
0062	白头鹤	Hooded Crane	*Grus monacha*	鹤形目	鹤科	鹤属	鹤鹳类
0063	黑颈鹤	Black-necked Crane	*Grus nigricollis*	鹤形目	鹤科	鹤属	鹤鹳类
0064	丹顶鹤	Red-crowned Crane	*Grus japonensis*	鹤形目	鹤科	鹤属	鹤鹳类
0065	花田鸡	Swinhoe's Yellow Rail	*Coturnicops exquisitus*	鹤形目	秧鸡科	花田鸡属	秧鸡类
0066	红腿斑秧鸡	Red-legged Crake	*Rallina fasciata*	鹤形目	秧鸡科	斑秧鸡属	秧鸡类
0067	白喉斑秧鸡	Slaty-legged Crake	*Rallina eurizonoides*	鹤形目	秧鸡科	斑秧鸡属	秧鸡类
0068	蓝胸秧鸡	Slaty-breasted Rail	*Gallirallus striatus*	鹤形目	秧鸡科	蓝胸秧鸡属	秧鸡类
0069	普通秧鸡	Water Rail	*Rallus aquaticus*	鹤形目	秧鸡科	秧鸡属	秧鸡类
0070	长脚秧鸡	Corn Crake	*Crex crex*	鹤形目	秧鸡科	长脚秧鸡属	秧鸡类
0071	红脚苦恶鸟	Brown Crake	*Amaurornis akool*	鹤形目	秧鸡科	苦恶鸟属	秧鸡类
0072	白胸苦恶鸟	White-breasted Waterhen	*Amaurornis phoenicurus*	鹤形目	秧鸡科	苦恶鸟属	秧鸡类
0073	棕背田鸡	Black-tailed Crake	*Porzana bicolor*	鹤形目	秧鸡科	田鸡属	秧鸡类
0074	姬田鸡	Little Crake	*Porzana parva*	鹤形目	秧鸡科	田鸡属	秧鸡类
0075	小田鸡	Baillon's Crake	*Porzana pusilla*	鹤形目	秧鸡科	田鸡属	秧鸡类
0076	斑胸田鸡	Spotted Crake	*Porzana porzana*	鹤形目	秧鸡科	田鸡属	秧鸡类
0077	红胸田鸡	Ruddy-breasted Crake	*Porzana fusca*	鹤形目	秧鸡科	田鸡属	秧鸡类
0078	斑胁田鸡	Band-bellied Crake	*Porzana paykullii*	鹤形目	秧鸡科	田鸡属	秧鸡类
0079	白眉秧鸡	White-browed Crake	*Porzana cinerea*	鹤形目	秧鸡科	田鸡属	秧鸡类
0080	董鸡	Watercock	*Gallicrex cinerea*	鹤形目	秧鸡科	董鸡属	秧鸡类
0081	紫水鸡	Purple Swamphen	*Porphyrio porphyrio*	鹤形目	秧鸡科	紫水鸡属	秧鸡类
0082	黑水鸡	Common Moorhen	*Gallinula chloropus*	鹤形目	秧鸡科	黑水鸡属	秧鸡类
0083	骨顶鸡	Common Coot	*Fulica atra*	鹤形目	秧鸡科	骨顶属	秧鸡类
0084	丘鹬	Eurasian Woodcock	*Scolopax rusticola*	鹳形目	丘鹬科	丘鹬属	鸻鹬类
0085	孤沙锥	Solitary Snipe	*Gallinago solitaria*	鹳形目	丘鹬科	沙锥属	鸻鹬类
0086	澳南沙锥	Latham's Snipe	*Gallinago hardwickii*	鹳形目	丘鹬科	沙锥属	鸻鹬类
0087	林沙锥	Wood Snipe	*Gallinago nemoricola*	鹳形目	丘鹬科	沙锥属	鸻鹬类
0088	针尾沙锥	Pintail Snipe	*Gallinago stenura*	鹳形目	丘鹬科	沙锥属	鸻鹬类
0089	大沙锥	Swinhoe's Snipe	*Gallinago megala*	鹳形目	丘鹬科	沙锥属	鸻鹬类
0090	扇尾沙锥	Common Snipe	*Gallinago gallinago*	鹳形目	丘鹬科	沙锥属	鸻鹬类

序号	中文名	英文名	拉丁文	目	科	属	归类
0091	姬鹬	Jack Snipe	*Lymnocryptes minimus*	鹳形目	丘鹬科	姬鹬属	鸻鹬类
0092	黑尾塍鹬	Black-tailed Godwit	*Limosa limosa*	鹳形目	丘鹬科	塍鹬属	鸻鹬类
0093	斑尾塍鹬	Bar-tailed Godwit	*Limosa lapponica*	鹳形目	丘鹬科	塍鹬属	鸻鹬类
0094	小杓鹬	Little curlew	*Numenius minutus*	鹳形目	丘鹬科	杓鹬属	鸻鹬类
0095	中杓鹬	Whimbrel	*Numenius phaeopus*	鹳形目	丘鹬科	杓鹬属	鸻鹬类
0096	白腰杓鹬	Eurasian Curlew	*Numenius arquata*	鹳形目	丘鹬科	杓鹬属	鸻鹬类
0097	大杓鹬	Eastern Curlew	*Numenius madagascariensis*	鹳形目	丘鹬科	杓鹬属	鸻鹬类
0098	鹤鹬	Spotted Redshank	*Tringa erythropus*	鹳形目	丘鹬科	鹬属	鸻鹬类
0099	红脚鹬	Common Redshank	*Tringa totanus*	鹳形目	丘鹬科	鹬属	鸻鹬类
0100	泽鹬	Marsh Sandpiper	*Tringa stagnatilis*	鹳形目	丘鹬科	鹬属	鸻鹬类
0101	青脚鹬	Common Greenshank	*Tringa nebularia*	鹳形目	丘鹬科	鹬属	鸻鹬类
0102	小青脚鹬	Nordmann's Greenshank	*Tringa guttifer*	鹳形目	丘鹬科	鹬属	鸻鹬类
0103	小黄脚鹬	Lesser Yellowlegs	*Tringa flavipes*	鹳形目	丘鹬科	鹬属	鸻鹬类
0104	白腰草鹬	Green Sandpiper	*Tringa ochropus*	鹳形目	丘鹬科	鹬属	鸻鹬类
0105	林鹬	Wood Sandpiper	*Tringa glareola*	鹳形目	丘鹬科	鹬属	鸻鹬类
0106	翘嘴鹬	Terek Sandpiper	*Xenus cinereus*	鹳形目	丘鹬科	翘嘴鹬属	鸻鹬类
0107	矶鹬	Common Sandpiper	*Actitis hypoleucos*	鹳形目	丘鹬科	鹬属	鸻鹬类
0108	灰尾漂鹬	Grey-tailed Tattler	*Heteroscelus brevipes*	鹳形目	丘鹬科	漂鹬属	鸻鹬类
0109	漂鹬	Wandering Tattler	*Heteroscelus incanus*	鹳形目	丘鹬科	漂鹬属	鸻鹬类
0110	翻石鹬	Ruddy Turnstone	*Arenaria interpres*	鹳形目	丘鹬科	翻石鹬属	鸻鹬类
0111	长嘴鹬	Long-billed Dowitcher	*Limnodromus scolopaceus*	鹳形目	丘鹬科	半蹼鹬属	鸻鹬类
0112	半蹼鹬	Asian Dotwitcher	*Limnodromus semipalmatus*	鹳形目	丘鹬科	半蹼鹬属	鸻鹬类
0113	大滨鹬	Great Knot	*Calidris tenuirostris*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0114	红腹滨鹬	Red Knot	*Calidris canutus*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0115	三趾滨鹬	Sanderling	*Calidris alba*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0116	西方滨鹬	Western Sandpiper	*Calidris mauri*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0117	勺嘴鹬	Spoon-billed Sandpiper	*Eurynorhynchus pygmeus*	鹳形目	丘鹬科	勺嘴鹬属	鸻鹬类
0118	小滨鹬	Little Stint	*Calidris minuta*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0119	红颈滨鹬	Red-necked Stint	*Calidris ruficollis*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0120	青脚滨鹬	Temminck's Stint	*Calidris temminckii*	鹳形目	丘鹬科	滨鹬属	鸻鹬类

序号	中文名	英文名	拉丁文	目	科	属	归类
0121	长趾滨鹬	Long-toed Stint	*Calidris subminuta*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0122	姬滨鹬	Least Sandpiper	*Calidris minutilla*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0123	白腰滨鹬	White-rumped Sandpiper	*Calidris fuscicollis*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0124	黑腰滨鹬	Baird's Sandpiper	*Calidris bairdii*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0125	斑胸滨鹬	Pectoral Sandpiper	*Calidris melanotos*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0126	尖尾滨鹬	Sharp-tailed Sandpiper	*Calidris acuminata*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0127	岩滨鹬	Rock Sandpiper	*Calidris ptilocnemis*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0128	黑腹滨鹬	Dunlin	*Calidris alpina*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0129	弯嘴滨鹬	Curlew Sandpiper	*Calidris ferruginea*	鹳形目	丘鹬科	滨鹬属	鸻鹬类
0130	高跷鹬	Stilt Sandpiper	*Calidris himantopus*	鹳形目	丘鹬科	高跷鹬属	鸻鹬类
0131	饰胸鹬	Buff-breasted Sandpiper	*Tryngites subruficollis*	鹳形目	丘鹬科	饰胸鹬属	鸻鹬类
0132	阔嘴鹬	Broad-billed Sandpiper	*Limicola falcinellus*	鹳形目	丘鹬科	阔嘴鹬属	鸻鹬类
0133	流苏鹬	Ruff	*Philomachus pugnax*	鹳形目	丘鹬科	流苏鹬属	鸻鹬类
0134	红颈瓣蹼鹬	Red-necked Phalarope	*Phalaropus lobatus*	鹳形目	丘鹬科	瓣蹼鹬属	鸻鹬类
0135	灰瓣蹼鹬	Red Phalarope	*Phalaropus fulicarius*	鹳形目	丘鹬科	瓣蹼鹬属	鸻鹬类
0136	彩鹬	Greater Painted-snipe	*Rostratula benghalensis*	鹳形目	彩鹬科	彩鹬属	鸻鹬类
0137	水雉	Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	鹳形目	雉鸻科	水雉属	鸻鹬类
0138	铜翅水雉	Bronze-winged Jacana	*Metopidius indicus*	鹳形目	雉鸻科	铜翅水雉属	鸻鹬类
0139	欧石鸻	Eurasian Thick-knee	*Burhinus oedicnemus*	鹳形目	石鸻科	石鸻属	鸻鹬类
0140	大石鸻	Great Thick-knee	*Esacus recurvirostris*	鹳形目	石鸻科	大石鸻属	鸻鹬类
0141	蛎鹬	Eurasian Oystercatcher	*Haematopus ostralegus*	鹳形目	鸻科	蛎鹬属	鸻鹬类
0142	鹮嘴鹬	Ibisbill	*Ibidorhyncha struthersii*	鹳形目	鸻科	鹮嘴鹬属	鸻鹬类
0143	黑翅长脚鹬	Black-winged Stilt	*Himantopus himantopus*	鹳形目	鸻科	长脚鹬属	鸻鹬类
0144	反嘴鹬	Pied Avocet	*Recurvirostra avosetta*	鹳形目	鸻科	反嘴鹬属	鸻鹬类
0145	金斑鸻	Pacific Golden Plover	*Pluvialis fulva*	鹳形目	鸻科	斑鸻属	鸻鹬类
0146	欧金斑鸻	European Golden Plover	*Pluvialis apricaria*	鹳形目	鸻科	斑鸻属	鸻鹬类
0147	灰斑鸻	Grey Plover	*Pluvialis squatarola*	鹳形目	鸻科	斑鸻属	鸻鹬类
0148	剑鸻	Common Ringed Plover	*Charadrius hiaticula*	鹳形目	鸻科	鸻属	鸻鹬类
0149	长嘴剑鸻	Long-billed Plover	*Charadrius placidus*	鹳形目	鸻科	鸻属	鸻鹬类
0150	金眶鸻	Little Ringed Plover	*Charadrius dubius*	鹳形目	鸻科	鸻属	鸻鹬类

序号	中文名	英文名	拉丁文	目	科	属	归类
0151	环颈鸻	Kentish Plover	*Charadrius alexandrinus*	鹳形目	鸻科	鸻属	鸻鹬类
0152	马来鸻	Malaysian Plover	*Charadrius peronii*	鹳形目	鸻科	鸻属	鸻鹬类
0153	蒙古沙鸻	Lesser Sand Plover	*Charadrius mongolus*	鹳形目	鸻科	鸻属	鸻鹬类
0154	铁嘴沙鸻	Greater Sand Plover	*Charadrius leschenaultii*	鹳形目	鸻科	鸻属	鸻鹬类
0155	红胸鸻	Caspian Plover	*Charadrius asiaticus*	鹳形目	鸻科	鸻属	鸻鹬类
0156	东方鸻	Oriental Plover	*Charadrius veredus*	鹳形目	鸻科	鸻属	鸻鹬类
0157	小嘴鸻	Eurasian Dotterel	*Charadrius morinellus*	鹳形目	鸻科	鸻属	鸻鹬类
0158	凤头麦鸡	Northern Lapwing	*Vanellus vanellus*	鹳形目	鸻科	麦鸡属	鸻鹬类
0159	距翅麦鸡	River Lapwing	*Vanellus duvaucelii*	鹳形目	鸻科	麦鸡属	鸻鹬类
0160	灰头麦鸡	Grey-headed Lapwing	*Vanellus cinereus*	鹳形目	鸻科	麦鸡属	鸻鹬类
0161	肉垂麦鸡	Red-wattled Lapwing	*Vanellus indicus*	鹳形目	鸻科	麦鸡属	鸻鹬类
0162	黄颊麦鸡	Sociable Lapwing	*Vanellus gregarius*	鹳形目	鸻科	麦鸡属	鸻鹬类
0163	领燕鸻	Collared Pratincole	*Glareola pratincola*	鹳形目	燕鸻科	燕鸻属	鸻鹬类
0164	普通燕鸻	Oriental Pratincole	*Glareola maldivarum*	鹳形目	燕鸻科	燕鸻属	鸻鹬类
0165	灰燕鸻	Small Pratincole	*Glareola lactea*	鹳形目	燕鸻科	燕鸻属	鸻鹬类
0166	大贼鸥	Brown Skua	*Stercorarius skua*	鹳形目	鸥科	大贼鸥属	鸥类
0167	麦氏贼鸥	South polar Skua	*Stercorarius maccormicki*	鹳形目	鸥科	大贼鸥属	鸥类
0168	中贼鸥	Pomarine Jaeger	*Stercorarius pomarinus*	鹳形目	鸥科	贼鸥属	鸥类
0169	短尾贼鸥	Parasitic Jaeger	*Stercorarius parasiticus*	鹳形目	鸥科	贼鸥属	鸥类
0170	长尾贼鸥	Long-tailed Jaeger	*Stercorarius longicaudus*	鹳形目	鸥科	贼鸥属	鸥类
0171	剪嘴鸥	Indian Skimmer	*Rynchops albicollis*	鹳形目	鸥科	剪嘴鸥属	鸥类
0172	黑尾鸥	Black-tailed Gull	*Larus crassirostris*	鹳形目	鸥科	鸥属	鸥类
0173	海鸥	Mew Gull	*Larus canus*	鹳形目	鸥科	鸥属	鸥类
0174	灰翅鸥	Glaucous-winged Gull	*Larus glaucescens*	鹳形目	鸥科	鸥属	鸥类
0175	北极鸥	Glaucous Gull	*Larus hyperboreus*	鹳形目	鸥科	鸥属	鸥类
0176	灰背鸥	Slaty-backed Gull	*Larus schistisagus*	鹳形目	鸥科	鸥属	鸥类
0177	银鸥	Herring Gull	*Larus argentatus*	鹳形目	鸥科	鸥属	鸥类
0178	乌灰银鸥	Heuglin's Gull	*Larus heuglini*	鹳形目	鸥科	鸥属	鸥类
0179	西伯利亚银鸥	Vega Gull	*Larus vegae*	鹳形目	鸥科	鸥属	鸥类
0180	蒙古银鸥	Mongolian Gull	*Larus mongolicus*	鹳形目	鸥科	鸥属	鸥类

序号	中文名	英文名	拉丁文	目	科	属	归类
0181	黄脚银鸥	Yellow-legged Gull	*Larus cachinnans*	鹳形目	鸥科	鸥属	鸥类
0182	渔鸥	Pallas's Gull	*Larus ichthyaetus*	鹳形目	鸥科	鸥属	鸥类
0183	棕头鸥	Brown-headed Gull	*Larus brunnicephalus*	鹳形目	鸥科	鸥属	鸥类
0184	红嘴鸥	Common Black-headed Gull	*Larus ridibundus*	鹳形目	鸥科	鸥属	鸥类
0185	细嘴鸥	Slender-billed Gull	*Larus genei*	鹳形目	鸥科	鸥属	鸥类
0186	黑嘴鸥	Saunders's Gull	*Larus saundersi*	鹳形目	鸥科	鸥属	鸥类
0187	遗鸥	Relict Gull	*Larus relictus*	鹳形目	鸥科	鸥属	鸥类
0188	小鸥	Little Gull	*Larus minutus*	鹳形目	鸥科	鸥属	鸥类
0189	弗氏鸥	Franklin's Gull	*Larus pipixca*	鹳形目	鸥科	鸥属	鸥类
0190	楔尾鸥	Ross's Gull	*Rhodostethia rosea*	鹳形目	鸥科	楔尾鸥属	鸥类
0191	叉尾鸥	Sabine's Gull	*Xema sabini*	鹳形目	鸥科	叉尾鸥属	鸥类
0192	三趾鸥	Black-legged Kittiwake	*Rissa tridactyla*	鹳形目	鸥科	三趾鸥属	鸥类
0193	鸥嘴噪鸥	Gull-billed Tern	*Gelochelidon nilotica*	鹳形目	鸥科	噪鸥属	鸥类
0194	红嘴巨鸥	Caspian Tern	*Hydroprogne caspia*	鹳形目	鸥科	燕鸥属	鸥类
0195	黄嘴河燕鸥	River Tern	*Sterna aurantia*	鹳形目	鸥科	燕鸥属	鸥类
0196	小凤头燕鸥	Lesser Crested Tern	*Sterna bengalensis*	鹳形目	鸥科	燕鸥属	鸥类
0197	大凤头燕鸥	Great Crested Tern	*Sterna bergii*	鹳形目	鸥科	燕鸥属	鸥类
0198	黑嘴端凤头燕鸥	Chinese Crested Tern	*Sterna bernsteini*	鹳形目	鸥科	燕鸥属	鸥类
0199	粉红燕鸥	Roseate Tern	*Sterna dougallii*	鹳形目	鸥科	燕鸥属	鸥类
0200	黑枕燕鸥	Black-naped Tern	*Sterna sumatrana*	鹳形目	鸥科	燕鸥属	鸥类
0201	普通燕鸥	Common Tern	*Sterna hirundo*	鹳形目	鸥科	燕鸥属	鸥类
0202	白额燕鸥	Little Tern	*Sterna albifrons*	鹳形目	鸥科	燕鸥属	鸥类
0203	尖尾燕鸥	Black-bellied Tern	*Sterna acuticauda*	鹳形目	鸥科	燕鸥属	鸥类
0204	白腰燕鸥	Aleutian Tern	*Sterna aleutica*	鹳形目	鸥科	燕鸥属	鸥类
0205	褐翅燕鸥	Bridled Tern	*Sterna anaethetus*	鹳形目	鸥科	燕鸥属	鸥类
0206	乌燕鸥	Sooty Tern	*Sterna fuscata*	鹳形目	鸥科	燕鸥属	鸥类
0207	须浮鸥	Whiskered Tern	*Chlidonias hybrida*	鹳形目	鸥科	浮鸥属	鸥类
0208	白翅浮鸥	White-winged Tern	*Chlidonias leucoptera*	鹳形目	鸥科	浮鸥属	鸥类
0209	黑浮鸥	Black Tern	*Chlidonias niger*	鹳形目	鸥科	浮鸥属	鸥类
0210	白顶玄鸥	Brown Noddy	*Anous stolidus*	鹳形目	鸥科	玄燕鸥属	鸥类

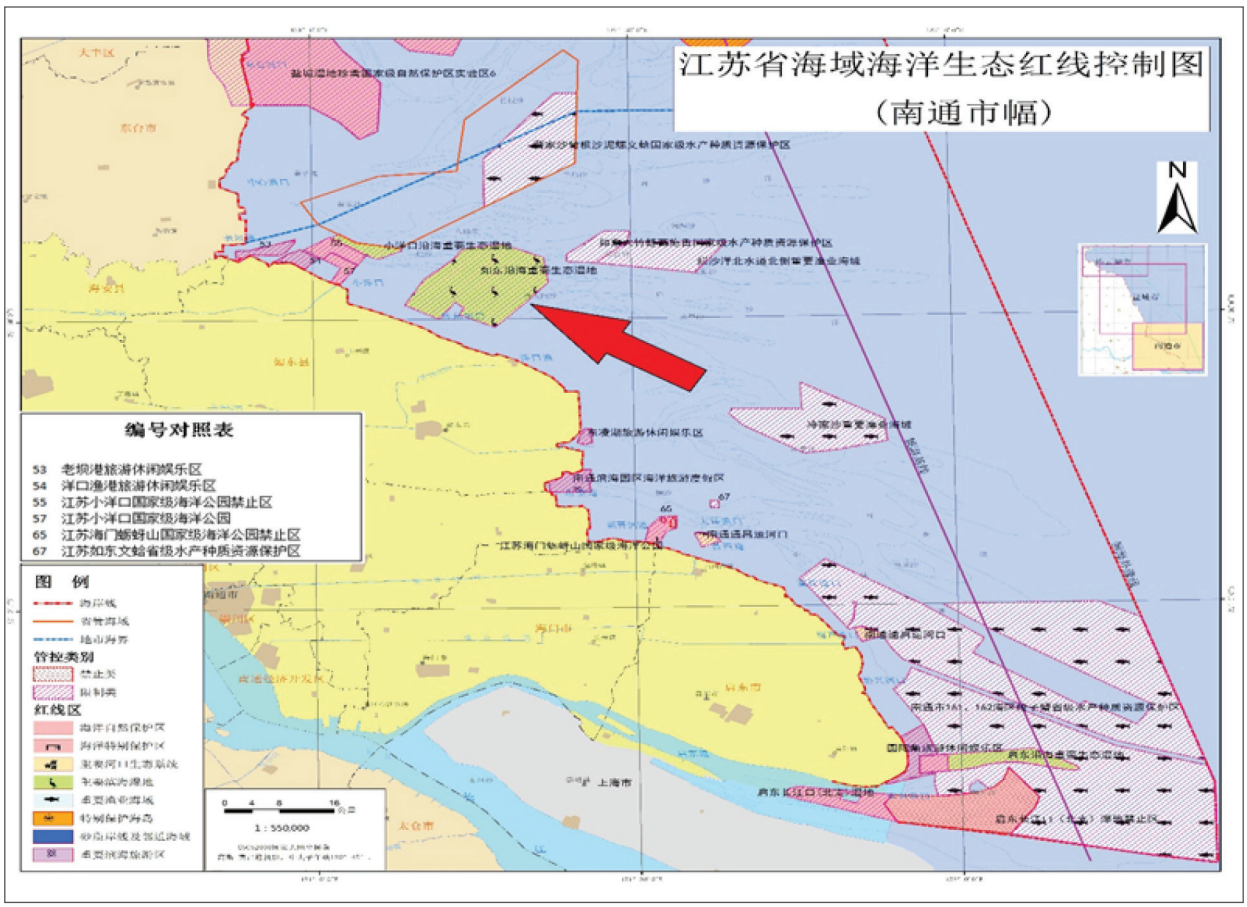
序号	中文名	英文名	拉丁文	目	科	属	归类
0211	白玄鸥	White Tern	*Gygis alba*	鹳形目	鸥科	玄燕鸥属	鸥类
0212	斑海雀	Long-billed Murrelet	*Brachyramphus perdix*	鹳形目	鸥科	斑海雀属	鸥类
0213	扁嘴海雀	Ancient Murrelet	*Synthliboramphus antiquus*	鹳形目	鸥科	扁嘴海雀属	鸥类
0214	冠海雀	Japanese Murrelet	*Synthliboramphus wumizusume*	鹳形目	鸥科	扁嘴海雀属	鸥类
0215	角嘴海雀	Rhinoceros Auklet	*Cerorhinca monocerata*	鹳形目	鸥科	角嘴海雀属	鸥类
0216	小䴙䴘	Little Grebe	*Tachybaptus ruficollis*	鹳形目	䴙䴘科	䴙䴘属	雁鸭类
0217	赤颈䴙䴘	Red-necked Grebe	*Podiceps grisegena*	鹳形目	䴙䴘科	䴙䴘属	雁鸭类
0218	凤头䴙䴘	Great Crested Grebe	*Podiceps cristatus*	鹳形目	䴙䴘科	䴙䴘属	雁鸭类
0219	角䴙䴘	Horned Grebe	*Podiceps auritus*	鹳形目	䴙䴘科	䴙䴘属	雁鸭类
0220	黑颈䴙䴘	Black-necked Grebe	*Podiceps nigricollis*	鹳形目	䴙䴘科	䴙䴘属	雁鸭类
0221	短尾鹱	Red-billed Tropicbird	*Phaethon aethereus*	鹳形目	鹱科	鹱属	海洋鸟类
0222	红尾鹱	Red-tailed Tropicbird	*Phaethon rubricauda*	鹳形目	鹱科	鹱属	海洋鸟类
0223	白尾鹱	White-tailed Tropicbird	*Phaethon lepturus*	鹳形目	鹱科	鹱属	海洋鸟类
0224	蓝脸鲣鸟	Masked Booby	*Sula dactylatra*	鹳形目	鲣鸟科	鲣鸟属	海洋鸟类
0225	红脚鲣鸟	Red-footed Booby	*Sula sula*	鹳形目	鲣鸟科	鲣鸟属	海洋鸟类
0226	褐鲣鸟	Brown Booby	*Sula leucogaster*	鹳形目	鲣鸟科	鲣鸟属	海洋鸟类
0227	黑腹蛇鹈	Oriental Darter	*Anhinga melanogaster*	鹳形目	蛇鹈科	蛇鹈属	鸬鹚类
0228	黑颈鸬鹚	Little Cormorant	*Phalacrocorax niger*	鹳形目	鸬鹚科	鸬鹚属	鸬鹚类
0229	普通鸬鹚	Great Cormorant	*Phalacrocorax carbo*	鹳形目	鸬鹚科	鸬鹚属	鸬鹚类
0230	暗绿背鸬鹚	Japanese Cormorant	*Phalacrocorax capillatus*	鹳形目	鸬鹚科	鸬鹚属	鸬鹚类
0231	红脸鸬鹚	Red-faced Cormorant	*Phalacrocorax urile*	鹳形目	鸬鹚科	鸬鹚属	鸬鹚类
0232	海鸬鹚	Pelagic Cormorant	*Phalacrocorax pelagicus*	鹳形目	鸬鹚科	鸬鹚属	鸬鹚类
0233	小白鹭	Little Egret	*Egretta garzetta*	鹳形目	鹭科	白鹭属	鹭类
0234	黄嘴白鹭	Chinese Egret	*Egretta eulophotes*	鹳形目	鹭科	白鹭属	鹭类
0235	岩鹭	Pacific Reef Heron	*Egretta sacra*	鹳形目	鹭科	白鹭属	鹭类
0236	斑鹭	Pied Heron	*Egretta picata*	鹳形目	鹭科	白鹭属	鹭类
0237	白脸鹭	White-faced Heron	*Egretta novaehollandiae*	鹳形目	鹭科	白鹭属	鹭类
0238	苍鹭	Grey Heron	*Ardea cinerea*	鹳形目	鹭科	鹭属	鹭类
0239	白腹鹭	White-bellied Heron	*Ardea insignis*	鹳形目	鹭科	鹭属	鹭类
0240	草鹭	Purple Heron	*Ardea purpurea*	鹳形目	鹭科	鹭属	鹭类

序号	中文名	英文名	拉丁文	目	科	属	归类
0241	大白鹭	Great Egret	*Casmerodius albus*	鹳形目	鹭科	白鹭属	鹭类
0242	中白鹭	Intermediate Egret	*Mesophoyx intermedia*	鹳形目	鹭科	白鹭属	鹭类
0243	牛背鹭	Cattle Egret	*Bubulcus ibis*	鹳形目	鹭科	牛背鹭属	鹭类
0244	池鹭	Chinese Pond Heron	*Ardeola bacchus*	鹳形目	鹭科	池鹭属	鹭类
0245	绿鹭	Striated Heron	*Butorides striata*	鹳形目	鹭科	绿鹭属	鹭类
0246	夜鹭	Black-crowned Night Heron	*Nycticorax nycticorax*	鹳形目	鹭科	夜鹭属	鹭类
0247	海南鸦	White-eared Night Heron	*Gorsachius magnificus*	鹳形目	鹭科	鸦属	鹭类
0248	栗鸦	Japanese Night Heron	*Gorsachius goisagi*	鹳形目	鹭科	鸦属	鹭类
0249	黑冠鸦	Malayan Night Heron	*Gorsachius melanolophus*	鹳形目	鹭科	鸦属	鹭类
0250	小苇鸦	Little Bittern	*Ixobrychus minutus*	鹳形目	鹭科	苇鸦属	鹭类
0251	黄苇鸦	Yellow Bittern	*Ixobrychus sinensis*	鹳形目	鹭科	苇鸦属	鹭类
0252	紫背苇鸦	Von Schrenck's Bittern	*Ixobrychus eurhythmus*	鹳形目	鹭科	苇鸦属	鹭类
0253	栗苇鸦	Cinnamon Bittern	*Ixobrychus cinnamomeus*	鹳形目	鹭科	苇鸦属	鹭类
0254	黑鸦	Black Bittern	*Dupetor flavicollis*	鹳形目	鹭科	黑鸦属	鹭类
0255	大麻鸦	Great Bittern	*Botaurus stellaris*	鹳形目	鹭科	麻鸦属	鹭类
0256	大火烈鸟	Greater Flamingo	*Phoenicopterus ruber*	鹳形目	红鹳科	火烈鸟属	鹤鹳类
0257	彩鹮	Glossy Ibis	*Plegadis falcinellus*	鹳形目	鹮科	彩鹮属	鹤鹳类
0258	黑头白鹮	Black-headed Ibis	*Threskiornis melanocephalus*	鹳形目	鹮科	白鹮属	鹤鹳类
0259	白肩黑鹮	White-shouldered Ibis	*Pseudibis davisoni*	鹳形目	鹮科	黑鹮属	鹤鹳类
0260	朱鹮	Crested Ibis	*Nipponia nippon*	鹳形目	鹮科	朱鹮属	鹤鹳类
0261	白琵鹭	Eurasian Spoonbill	*Platalea leucorodia*	鹳形目	鹮科	琵鹭属	鹭类
0262	黑脸琵鹭	Black-faced Spoonbill	*Platalea minor*	鹳形目	鹮科	琵鹭属	鹭类
0263	白鹈鹕	Great White Pelican	*Pelecanus onocrotalus*	鹳形目	鹈鹕科	鹈鹕属	雁鸭类
0264	卷羽鹈鹕	Dalmatian Pelican	*Pelecanus crispus*	鹳形目	鹈鹕科	鹈鹕属	雁鸭类
0265	斑嘴鹈鹕	Spot-billed Pelican	*Pelecanus philippensis*	鹳形目	鹈鹕科	鹈鹕属	雁鸭类
0266	白头鹮鹳	Painted Stork	*Mycteria leucocephala*	鹳形目	鹳科	鹮鹳属	鹤鹳类
0267	钳嘴鹳	Asian Openbill	*Anastomus oscitans*	鹳形目	鹳科		鹤鹳类
0268	黑鹳	Black Stork	*Ciconia nigra*	鹳形目	鹳科	鹳属	鹤鹳类
0269	白鹳	White Stork	*Ciconia ciconia*	鹳形目	鹳科	鹳属	鹤鹳类
0270	东方白鹳	Oriental Stork	*Ciconia boyciana*	鹳形目	鹳科	鹳属	鹤鹳类

序号	中文名	英文名	拉丁文	目	科	属	归类
0271	秃鹳	Lesser Adjutant	*Leptoptilos javanicus*	鹳形目	鹳科	秃鹳属	鹤鹳类
0272	小军舰鸟	Great Frigatebird	*Fregata minor*	鹳形目	军舰鸟科	军舰鸟属	海洋鸟类
0273	白斑军舰鸟	Lesser Frigatebird	*Fregata ariel*	鹳形目	军舰鸟科	军舰鸟属	海洋鸟类
0274	白腹军舰鸟	Christmas Island Frigatebird	*Fregata andrewsi*	鹳形目	军舰鸟科	军舰鸟属	海洋鸟类
0275	红喉潜鸟	Red-throated Loon	*Gavia stellata*	鹳形目	潜鸟科	潜鸟属	海洋鸟类
0276	黑喉潜鸟	Black-throated Loon	*Gavia arctica*	鹳形目	潜鸟科	潜鸟属	海洋鸟类
0277	太平洋潜鸟	Pacific Loon	*Gavia pacifica*	鹳形目	潜鸟科	潜鸟属	海洋鸟类
0278	普通潜鸟	Common Loon	*Gavia immer*	鹳形目	潜鸟科	潜鸟属	海洋鸟类
0279	白嘴潜鸟	Yellow-billed Loon	*Gavia adamsii*	鹳形目	潜鸟科	潜鸟属	海洋鸟类
0280	暴雪鞘	Northern Fulmar	*Fulmarus glacialis*	鹳形目	鞘科	暴雪鞘属	海洋鸟类
0281	钩嘴圆尾鞘	Tahiti Petrel	*Pseudobulweria rostrata*	鹳形目	鞘科	圆尾鞘属	海洋鸟类
0282	点额圆尾鞘	Bonin Petrel	*Pterodroma hypoleuca*	鹳形目	鞘科	圆尾鞘属	海洋鸟类
0283	纯褐鞘	Bulwer's Petrel	*Bulweria bulwerii*	鹳形目	鞘科	纯褐鞘属	海洋鸟类
0284	白额鞘	Streaked Shearwater	*Calonectris leucomelas*	鹳形目	鞘科	鞘属	海洋鸟类
0285	曳尾鞘	Wedge-tailed Shearwater	*Puffinus pacificus*	鹳形目	鞘科	剪水鞘属	海洋鸟类
0286	肉足鞘	Flesh-footed Shearwater	*Puffinus carneipes*	鹳形目	鞘科	剪水鞘属	海洋鸟类
0287	灰鞘	Sooty Shearwater	*Puffinus griseus*	鹳形目	鞘科	剪水鞘属	海洋鸟类
0288	短尾鞘	Short-tailed Shearwater	*Puffinus tenuirostris*	鹳形目	鞘科	剪水鞘属	海洋鸟类
0289	短尾信天翁	Short-tailed Albatross	*Phoebastria albatrus*	鹳形目	鞘科	信天翁属	海洋鸟类
0290	黑脚信天翁	Black-footed Albatross	*Phoebastria nigripes*	鹳形目	鞘科	信天翁属	海洋鸟类
0291	黑背信天翁	Laysan Albatross	*Phoebastria immutabilis*	鹳形目	鞘科	信天翁属	海洋鸟类
0292	烟黑叉尾海燕	Matsudaira's Storm Petrel	*Oceanodroma matsudairae*	鹳形目	鞘科	烟黑叉尾海燕属	海洋鸟类
0293	白腰叉尾海燕	Leach's Storm-petrel	*Oceanodroma leucorhoa*	鹳形目	鞘科	烟黑叉尾海燕属	海洋鸟类
0294	黑叉尾海燕	Swinhoe's Storm-petrel	*Oceanodroma monorhis*	鹳形目	鞘科	叉尾海燕属	海洋鸟类
0295	日本叉尾海燕	Matsudaira's Storm-petrel	*Oceanodroma matsudairae*	鹳形目	鞘科	叉尾海燕属	海洋鸟类
0296	不能辨认的沙锥	Snipe sp.					鸻鹬类

序号	中文名	英文名	拉丁文	目	科	属	归类
0297	不能辨认的银鸥	Herring Gull sp.					鸥类
0298	不能辨认的鸭类	Duck sp.					雁鸭类
0299	不能辨认的大型鸥	Large Gull spp.					鸥类
0300	不能辨认的小型涉禽（不包括沙锥）	Small Wader spp.					鸻鹬类
0301	不能辨认的涉禽类	Wader sp.					鹤鹳类
0302	普通翠鸟	Common Kingfisher	*Alcedo atthis*	佛法僧目	翠鸟科	翠鸟属	海洋鸟类
0303	白胸翡翠	White-throated Kingfisher	*Halcyon smyrnensis*	佛法僧目	翠鸟科	翡翠属	海洋鸟类
0304	蓝翡翠	Black-capped Kingfisher	*Halcyon pileata*	佛法僧目	翠鸟科	翡翠属	海洋鸟类
0305	斑鱼狗	Pied Kingfisher	*Ceryle rudis*	佛法僧目	鱼狗科	鱼狗属	海洋鸟类
0306	鹗	Osprey	*Pandion haliaetus*	鹳形目	鹰科	鹗属	海洋鸟类
0307	黑翅鸢	Black-winged Kite	*Elanus caeruleus*	鹳形目	鹰科	黑翅鸢属	海洋鸟类
0308	黑鸢	Black Kite	*Milvus migrans*	鹳形目	鹰科	鸢属	海洋鸟类
0309	黑耳鸢	Black-eared Kite	*Milvus lineatus*	鹳形目	鹰科	鸢属	海洋鸟类
0310	白腹海雕	White-bellied Eagle	*Haliaeetus leucogaster*	鹳形目	鹰科	海雕属	海洋鸟类
0311	玉带海雕	Pallas's Fish Eagle	*Haliaeetus leucoryphus*	鹳形目	鹰科	海雕属	海洋鸟类
0312	白尾海雕	White-tailed Sea Eagle	*Haliaeetus albicilla*	鹳形目	鹰科	海雕属	海洋鸟类
0313	虎头海雕	Steller's Sea Eagle	*Haliaeetus pelagicus*	鹳形目	鹰科	海雕属	海洋鸟类
0314	渔雕	Lesser Fish Eagle	*Ichthyophaga humilis*	鹳形目	鹰科	渔雕属	海洋鸟类
0315	白头鹞	Western Marsh Harrier	*Circus aeruginosus*	鹳形目	鹰科	鹞属	海洋鸟类
0316	白腹鹞	Eastern Marsh Harrier	*Circus spilonotus*	鹳形目	鹰科	鹞属	海洋鸟类
0317	白尾鹞	Northern Harrier	*Circus cyaneus*	鹳形目	鹰科	鹞属	海洋鸟类
0318	普通鵟	Common Buzzard	*Buteo buteo*	鹳形目	鹰科	鵟属	海洋鸟类
0319	乌雕	Greater Spotted Eagle	*Aquila clanga*	鹳形目	鹰科	雕属	海洋鸟类
0320	白肩雕	Eastern Imperial Eagle	*Aquila heliaca*	鹳形目	鹰科	雕属	海洋鸟类
0321	游隼	Peregrine Falcon	*Falco peregrinus*	鹳形目	隼科	隼属	海洋鸟类
0322	白颈鸦	Collared Crow	*Corvus pectoralis*	雀形目	鸦科	鸦属	海洋鸟类
0323	丝光椋鸟	Red-billed Starling	*Sturnus sericeus*	雀形目	椋鸟科	椋鸟属	海洋鸟类

Appendix 2: Jiangsu Province marine eco-redline plan (For Nantong City)



UNDP/GEF YSLME Phase II Project Management Office
Email: yinfengg@unops.org
Website: www.yslme.org

Incheon Secretariat
18th floor
G-Tower
175 Art center-daero, Yeonsu-gu,
Incheon 22004
RO Korea
Tel: +82 (0)32 859 7711

Dalian Branch
National Marine Environment
Monitoring Center of State Oceanic
Administration
P.O. Box 303, Linghe Street 42
Dalian 116023
Liaoning
PR China
Telephone: +86 (0)411 8478 0700