Executive Summary

State party	People's Republic of China	
State, province or region	Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) World Natural Heritage Nominated Properties are located in several counties (districts) in Yancheng Municipality, Jiangsu Province, China as below: Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1, short for Yellow Sea-1): Sheyang County, Tinghu District, and Dafeng District Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2, short for Yellow Sea-2): Dafeng District, Dongtai City and Dongsha	
Name of property	Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)	
Geographical coordinates to the nearest second	Range of coordinates	
	Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1)	N 32°40′18.862″-33°11′31.44″ E 120°43′50.14″-121°18′10.91″
	Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2)	N 33°17′26.52″-33°49′9.18″ E 120°36′30.18″-120°40′46.86″
	Central coordinates	
	Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1)	N 32°55′55″, E 121°1′0.53″

	Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2)	N 33°33′17.85″, E 120°36′5.46″
Textual description of the boundaries of the nominated property	Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China are located in the Yellow Sea ecoregion, which attracts massive attention from the global conservation community. The Yellow Sea and Bohai Gulf coast contain the world's largest intertidal mudflat, a key node of the East Asian-Australasian Flyway. The East Asian-Australasian Flyway, among all the main flyways, is used by the largest number of migratory bird species, as well as the largest number of threatened species. Large rivers (Yellow River, Yangtze River, Yalu River, Liao River, Luan River, and Hai River etc.) continuously discharge sediments into Yellow Sea and Bohai Gulf, accumulating to form a series of different habitat types such as mudflats, beaches, and swamps, providing habitats for various migratory birds. These globally important habitats have been maintaining the amazing bird biodiversity on the East Asian-Australasian Flyway. Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a serial nominated property for the inscription on the World Heritage List, which will be submitted in two phases. The phase I of the nominated property is composed of two separate component parts in Yancheng, Jiangsu Province, China: Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1) and Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2), located in the southern part of the west coast of Yellow Sea. These areas are nominated to meet the Criteria (ix) and (x), and represent the outstanding universal value of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China.	

	1. The boundaries of YS-1 are mainly determined according to the typical vegetation zones in this area, as well as the marine and terrestrial habitat types, such as intertidal mudflats and radial sand ridges. The main part of this area is within the range of Jiangsu Dafeng National Nature Reserve, the experimental zone of Jiangsu Yancheng National Nature Reserve, Jiangsu Yancheng Tiaozini Wetland Park, Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Jiangsu Dongtai Tiaozini Wetland Nature Reserve Plots. The north boundary starts from Zhugangzha, extends towards east to the north boundary of Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve. The west boundary starts from Zhugangzha, extends towards south along the boundary of reclamation area to Chuandonggang, turns west for 2.18 km, turns southwest to Dongchuan sea dyke, extends along the Chuanxin Road for 2.75 km, reaches the north boundary of reclamation area and turns to east to the Liangduohezha, turns south along the ridge of reclamation area, reaches to the north boundary of Tiaobei 2-12 and then turns east, along the Tiaozini dyke to the Tiaozini Scenic Area and turns west to the esat boundary of Tiaonan freshwater aquiculture, and turns south to the south boundary of Tiaozini reclamation area. The south boundary starts from the south boundary of Jiangsu Yancheng Tiaozini Wetland Park, extends towards east along the south boundary of Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and end at the 21 km east of Tiaozini Scenic Area. The east boundary coincides with the east boundary of Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Dongsha Experiment Zone. On the east of the nominated property lies a subtidal mudflat, where there is no fixed artificial facility and the extremely complicated hydrological condition makes it very dangerous for small boats, and large ships are not allowed to approach, so it is not necessary to

	establish a buffer zone on the east side. The buffer zone is mainly located on the west (land side) of nominated property. The north boundary starts from the intersection of Zhugangzha and G228, extends towards east along the river to Zhugangzha. The west boundary starts from the intersection of Zhugangzha and G228, extends towards south along the sea dyke across the river of Dongchuangang, turns west for 2.8 km, turns southeast along X202 road to the boundary of Jiangsu Dafeng National Nature Reserve. From this point, the west boundary extends towards south and turns to X302 when reach the Liangduohe, along the west boundary of Tiaozini reclamation area and end at the south boundary. The south boundary is the south boundary of Tiaozini reclamation area. The east boundary starts from where Zhugangzha enters the sea, extends towards south, extends along the boundary of reclamation area to Chuanxin Road, turns west for 2.18 km and then turns southwest to Dongchuan sea dyke. Starting from this point, the east boundary turns towards southeast along Chuanxin Road, then turns south to the north boundary of reclamation area and then turns east for 2.75 km, turns south and reaches the north boundary of reclamation area and turns to east to the Liangduohezha, turns south along the ridge of reclamation area, reaches to the north boundary of Tiaobei 2-12 and then turns east, along the Tiaozini dyke to the Tiaozini Scenic Area and turns west to the esat boundary of Tiaonan freshwater aquiculture, and turns south to the south boundary of Tiaozini reclamation area. 2. The boundaries of YS-2 are mainly determined according to the typical vegetation zones in this area, and the integrity of intertidal mudflat habitats. This component is located within Jiangsu Yancheng National Nature Reserve. The North boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards east for 5 km. The west boundary

	starts at the location 1.7 km south from Sheyang River estuary, extends towards southeast along the boundary of reclamation area to Xinyanggang estuary and reaches the north boundary of the core area of Yancheng Wetland Rare Birds National Nature Reserve. From the south bank of Xinyang Harbor, the west boundary extends 1943 m southwards, turns towards 405 m east of the sea dyke, extends southwards parallel to the sea dyke until the boundary of Dafeng County, extends 100 m southwards to the north bank of Doulong Harbor, then eastwards along the sea dyke until the boundary of Dafeng County, extends 100 m southwards to the north bank of Doulong Harbor, then eastwards along the bank until the -3m isobath, and turns southward towards the parallel line 3 km south of the eastward extension of Simaoyou River. The south boundary is the parallel line 3 km south of the eastward extension of Simaoyou River, extending eastwards until 5km offshore. The east boundary is the -3m isobath, which marks the boundary of intertidal zone. On the east of the nominated property lies a subtidal mudflat, where there is no fixed artificial facility and the extremely complicated hydrological condition does not allow large ships to approach, so it is not necessary to establish a buffer zone on the east side. The buffer zone is mainly located on the west (land side) of nominated property. The north boundary starts from Huangshagang, extends towards east, turns northeast along the north boundary of the middle section of Jiangsu Yancheng National Nature Reserve to 1.7 km south from Sheyang river estuary. The west boundary starts from Huangshagang, extends southeast along the east side of Huanghuang road, turns south, extends across Xinyanggang along the east side of S331, turns southwest at Zhonglugang, turns south along the Xichao river, turns southeast at Fangqiang Farm along the river, turns east at Dongfanghongqizu, reaches sea dyke road at Doulonggang, turns south to Sanmaoyou river along sea dyke road

	and G228. The south boundary starts at Sanmaoyou river, extends eastwards to sea dyke road, and extends northwards along the road to the line 3 km south, parallel to eastward extension of Simaoyou River, and reaches the -3m isobath. The east boundary starts at 1.7 km south from Sheyang river, turns southeast along the boundary of reclamation area, reaches Xinyanggang estuary and the north boundary of the core area of Yancheng National Nature Reserve, The east boundary coincides with the west boundary of the nominated property.
A4 or A3 size map of the nominated property, showing boundaries and buffer zones	Figure 1-1 Location of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in China Figure 1-2 Location of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in Jiangsu Province Figure 1-3 Detailed map of Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1) Figure 1-4 Detailed map of Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2)
Criteria under which property is nominated	Criteria (ix) and (x)
Draft Statement of Outstanding Universal Value	**a) Brief synthesis** The coast of Yellow Sea and Bohai Gulf contains the world's largest continuous mudflat seashore. Sediments and nutrients are continuously discharged from the Yellow River and Yangtze River (two of the ten world longest rivers) and other rivers including Yalu River, Liao River, Luan River and Hai River, and form fertile mudflats, radial sand ridges and sandbanksas well as sand dunes, lagoons,

	rocky shores, and islands where threatened birds aggregate to breed. Nowadays, the dynamic process of river sediment discharge and tectonic subsidence continue to shape wetland landscape and ecosystem on the Bohai Gulf-Yellow Sea coast, making it one of the most diverse and fertile coasts in the world, providing key sanctuaries for migratory birds on the East Asian-Australasian Flyway. The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a serial world natural heritage nominated property consisting of natural wetland habitats such as deltas, sandbanks, mudflats, saltwater/freshwater swamps, rocky shores, islands and ancient coastlines, as well as salt pans, fish ponds and rice paddies. The serial nominated property range from Northeast China to East China, providing key stopovers, wintering grounds or breeding grounds for threatened migratory bird species, constituting one of the world's most diverse and magnificent temperate coastal sanctuaries and ecosystems, and an indispensable part of the global biodiversity conservation. Some of the species are the world's most noticed threatened birds, including two critically endangered water birds: the Chinese crested-tern (*Thalasseus bernsteini*) with the global population just more than a hundred, the spoon-billed sandpiper (*Eurynorhynchus pygmeus*), with only hundreds of individuals left in the world. Almost all individuals of the Nordmann's greenshank (*Tringa guttifer*), the great knot (*Calidris tenuirostris*), and the Far Eastern curlew (*Numenius madagascariensis*) depend on these habitats. The East Asian-Australasian Flyway Partnership assessed the importance of 1030 key wetlands on the flyway. The results showed that the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast, and are thus suitable for the first phase of the nominated

	property. The serial nominated property Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) consists of two components: 1) Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1) and 2) Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2). The two components are separated by the Dafeng Port and the surrounding areas with dense human activity, with their boundaries about 30 kilometers apart. **Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1).** The component covers an area of nominated property 144,839 ha, plus a buffer zone of 28,271 ha on the west. Dafeng contains typical habitat types of secondary forest on marine deposition plain and freshwater reed marsh. The southern section of Yancheng Reserve and Dongsha embody the complete ecosystems of intertidal mudflats, radial sand banks and sand ridges. Dafeng is home to the world's largest captive population and largest reintroduced population of Père David's deer (or milu, *Elaphurus davidianus*). The southern section of Yancheng Reserve, Dongsha, Tiaozini and Gaoni provide an important stopover site for the waders on the East Asian-Australasian Flyway. Half of the world's Spoon-billed Sandpipers and Nordmann's greenshanks make long stopovers, feed, or even moult in the nominated site and surrounding areas. **Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2).** This component is located in Sheyang County, Tinghu District, Yancheng, Jiangsu, containing the core area in the middle section of Jiangsu Yancheng National Nature Reserve. The area of the nominated property is 43,804 ha, plus a buffer zone of 51,785 ha on the west. The middle part of Yancheng Reserve mainly consist of habitat types of freshwater reed marsh and intertidal mudflat. It provides the most important wintering ground for the migratory population of red-crowned crane (*Grus japonensis*), with about 50% (in some years 80%) of individuals spending the winter here each

year.

The area involved in the two nominated properties above constitutes the largest intertidal flat on the west bank of Pacific Ocean. Within the two nominated properties, large tracts of coastal habitats remain less disturbed by human activity, retaining the natural ecosystem structure and functions, becoming one of the natural coastlines rare in this country and the world. The main body of the marine deposition plain and mudflat is formed before 1855, when Yellow River changing its course back to the north. Nowadays, the intertidal mudflat is still mainly in the process of accumulation under the special marine hydrological processes. The above process has shaped the crucial habitat for threatened species such as the red-crowned crane, the spoon-billed sandpiper and the Nordmann's greenshank in the serial nomination properties (Phase I). These habitats, together with other sites along the Chinese coast to be nominated in the future, form indispensable links in the conservation network for more than 20 threatened bird species on the East Asian-Australasian Flyway.

b) Justification for criteria

Criterion (ix): Since the Pleistocene, great rivers such as the Yellow River and the Yangtze River have been endlessly flowing into the Yellow Sea and the Bohai Gulf, carrying massive material from the Qinghai-Tibet Plateau and the Central Asian desert. On the other hand, the continental shelf in Yellow Sea and Bohai Gulf have been in the process of continuous subsidence. Accumulation of river sediment discharge and tectonic subsidence, combined with marine hydrological processes and climate change, have jointly shaped the natural landscape along the Yellow Sea and Bohai Gulf coast, forming the basis for the occurrence and evolution of ecosystems.

The sites for the first phase of serial nomination have long been

	under the influence of the Yangtze River, the largest river in Asia. Between A.D. 1194 and 1855, the Yellow River, with the largest known sand discharge, used to enter the sea near the nominated properties. The nominated properties are located in a region where the river (terrestrial) and marine ecosystems interact intensely, probably the most typical of its type in modern times. A large amount of river sediment discharge interacts with the ocean current to form intertidal mudflats and unique radial sand ridges. During the sea transgression and regression since the late Pleistocene, the sediments discharged from the ancient Yangtze River estuary and Huai River estuary have accumulated to form more than 30,000 km^2 of radial sand ridges centered at Jianggang, under the influence of special radial flow in the coastal waters of Yellow Sea. Radial sand ridges, sand banks and tidal channels constitute the largest part of the nominated site YS-1. Radial sand ridges have always been changing under the intense influence of tidal currents and storms, but the general trend is to merge and expand, and to move toward the shore. Sand banks in the middle of the radial structure or close to the shore are mostly accumulating and growing. The dynamic changes of these landscapes driven by changes of river and marine hydrology and climate have become the major driving forces of the evolution of ecosystems and even species. It is in order to feed on the diverse benthic animals living in such dynamically changing habitats that the waders here undergo adaptive divergent evolution. The coastal area within the YS-2 nominated area is mainly plains formed by marine deposition. Due to the tidal asymmetry (fast flood tides and slow ebb tides), the sediments transported by tides can be accumulated in the intertidal zone. This is an important driving force for the formation of the plains. Large rivers discharge into the southern Yellow Sea a large amount of sediments, which are then

	suspended and transported by tides and waves to be deposited in the intertidal zone. Meanwhile, the coastal plain continuously silts up, advancing to the sea, forming unique intertidal mudflats. The vegetation zones in the nominated area shows remarkable characteristics of coastal wetland vegetation: with changes of soil salinity and seawater submergence, the vegetation structure in the nominated area shows obvious transition and clear succession. From the sea side to the land side, the transition types are: mudflat with no vegetation, *Spartina alterniflora* marsh, *Suaeda glauca* marsh, *Aeluropus sinensis* grassland, *Imperata cylindrical* grassland or reed marsh. On the most salty mudflats with no vegetation live the most abundant benthic animals, which provide rich food resources for migrating birds. On the land side of the mudflats, *Spartina alterniflora* communities exist in some areas. Further toward the land side grow salt-tolerant plants, such as *Suaeda glauca* and *Salicornia europaea*. In the areas with salinity as low as 0.6% -1.0%, the amount of *Aeluropus sinensis* increases in the *Suaeda glauca* community. The type of vegetation that appears furthest toward the land side is *Imperata cylindrical* grassland, often accompanied by *Setaria viridis*, *Artemisia capillaris*, reeds *Phragmites communis*, *Zoysia macrostachya* and other plants. In addition, large reed communities distribute in water-rich areas, such as lower mudflats and the estuarine zone. These areas often used by birds such as red-crowned cranes. The spatial distribution of habitat types and vegetation communities change with the dynamic changes of the muddy shore, forming the basis for the maintenance of biodiversity. These two nominated properties not only represent the typical characteristics of the coastal and marine ecosystems and their changes in landscape pattern, but also highlight the evolution of their plant communities against the background of the dynamic changes in coastal landscape. At the same time, their ecosystem supporting

	services also fully reflect the ecological and physiological processes in various organisms related to adaptation and evolution, making the area an outstanding example of coastal and marine ecosystems. **Criterion (x):** The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China concentrates threatened bird species and their habitats of global concern, and has outstanding value in conservation and scientific research. These areas are located on the East Asian-Australasian Flyway, where the number of threatened waterbird species is much higher than the other seven major flyways in the world. Moreover, the first phase of the serial nomination involves the flyway's highest-rated reserve and key habitat for threatened birds. The nominated properties involve Jiangsu Dafeng National Nature Reserve and Jiangsu Yancheng National Nature Reserve, both located in the south of Yellow Sea Ecoregion (#203 in the WWF Global 200 Ecoregions), containing the world's largest continuous mudflat seashore, already listed as important wetlands in the Ramsar Convention. As one of the best preserved intertidal mudflats, Jiangsu Yancheng National Nature Reserve has joined UNESCO's Man and Biosphere reserves network. The area features rich biodiversity, providing key stopovers, breeding grounds and wintering grounds for migrating waterbirds on the East Asian-Australasian Flyway. Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1) is located in the central keynode range of East Asian-Australasian Flyway, 7000 kilometers apart from both the breeding and wintering grounds of waders, and thus serves as an indispensable stopover and "gas station". For waders, Dafeng and Dongsha and the vast surrounding area is the largest and the most important stopover on this flyway. The radial sand ridges and surrounding areas where Dongsha is located are the autumn stopover and moulting ground for

	more than 50% of spoon-billed sand pipers, a globally critically endangered species. In addition, Dafeng is currently home to more than two-thirds of the global population of wild Père David's deer, providing a model for reintroduction and rewilding of large mammals after extinction in the wild. Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2) is an important habitat for the critically endangered species Baer's pochard (*Aythya baeri*) and Siberian white crane (*Leucogeranus leucogeranus*). It is also the most important wintering ground for the endangered species red-crowned crane (*Grus japonensis*), with the wintering population accounting for more than 40% - 55% of the species' migratory population. Meanwhile, the nominated property is also a stopover site for about 10% of the population of the endangered species black-faced spoonbill (*Platalea minor*), and one of the important breeding and wintering grounds for the vulnerable species Saunders's gull (*Larus saundersi*). **c) Statement of integrity** The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China involve large tracts of mudflats, beaches and other habitats connected to them through the migration of birds, consisting the largest coastal migratory bird habitat system, serving as key stopovers for bird migration between the two hemispheres and an important part of the East Asian-Australasian Flyway. The vast space provide high quality rest stops for more than a hundred species and millions individuals of migratory waterbirds, to replenish the fat they need for the continued flight. The phase I of the serial nominated property includes all the intertidal wetlands undisturbed by human activity, including two existing nature reserves, one wetland park and two wetlands nature reserve plots, especially the radial sand ridges covered by the reserves. The

	nominated properties adequately reflect and protect all kinds of natural, dynamic elements of the intertidal wetlands. The area presents a coherent landscape spectrum, from wetlands on the land side to radial sand ridges, showing comprehensively the evolution of landforms and habitats related to tidal processes. Yancheng wetlands on the Yellow Sea coast feature unique, complete intertidal mudflats in fresh water, brackish water and salt water zones. The nominated property (Phase I) and buffer zone of more than 260,000 ha will ensure the continuity of ecological functions, and the ecological processes in the intertidal zone can happen without restriction. Sufficient area, high quality mudflats and undisturbed natural ecosystems provide good stopovers and ample space for migratory birds. Among them, YS-1 contains sandbanks, sand ridges, tidal channels and sea areas located in radial sand ridges, providing an important feeding ground for waders during low tides. The area also contains a series of habitat types from coastal mudflats to inland wetlands, providing resting areas for waders during high tides. The inland section includes the main range of Père David's deers and their all suitable types of habitats. YS-2 is the area with the highest concentration of red-crowned cranes, as well as a habitat favoured by other cranes, geese and ducks. The current nominated area contains all high quality habitats and all types of feeding and resting habitats for red-crowned cranes. At present, the nominated properties (Phase I) and buffer zones are located within Jiangsu Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve, Jiangsu Yancheng Tiaozini Wetland Park, Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Jiangsu Dongtai Tiaozini Wetland Nature Reserve Plots. All strictly protected by the laws of China. The official Ecological Red

Lines also provide adequate protection. These management and protection policies can ensure that the region remains undisturbed, maintaining intact ecosystems and ecological processes.

The nominated property (Phase I) include the core areas and intertidal wetlands in the two reserves, wetland park and two nature reserve plots, as well as the Dongsha district, while the buffer zones and experimental zones of the two reserves, and Tiaozini reclamation area surround the west side (land side) of the nominated property, providing adequate buffer and protection from the inland direction. At the same time, the ongoing sustainable management of farmland, fish ponds and salt pans in the buffer zone also provided a space for the diffusion and movement of threatened species such as the red-crowned crane and the Père David's deer.

d) Requirements for protection and management

The nominated property is state-owned, with the status of national nature reserves and municipal level protected areas. A multi-level management system has been established from the state to the local areas, forming a mechanism for collaborative protection between government agencies and communities, social organizations and research institutes, with staff and funding guaranteed. Under the strict protection by the laws and regulations of the country and the local government, the natural status of coastal intertidal wetlands has been effectively maintained through the cooperation between government agencies, communities and social organizations, ensuring the survival and reproduction of the species, providing stopovers for migratory birds. At both national and provincial levels, the government has paid great attention to the protection and management of World Natural Heritage sites. The Outline for the *13th Five-Year Plan of Jiangsu Province* clearly states, "we will support the Dafeng and Yancheng Nature Reserves to be nominated for the inscription on the World Natural Heritage List, and ensure that the

	ecological diversity of the key regional watershed improves steadily." In the future, we will continue to strengthen the protection and management of the nominated properties in the following aspects: 1) Strengthen the monitoring and research of the elements with natural heritage values, including landscapes and biological elements, in order to implement adaptive management. 2) Monitor and study the threats, and carry out targeted prevention, control or remediation measures; 3) involving enterprises and residents in the nominated properties and buffer zones in the management, monitoring and public education actions, and continue to promote public participation and concern in the protection work; 4) improve the interpretation system, control the number of tourists and enhance the ecological education for tourists; regulate access to tourist areas, strengthen supervision and keep the impact of tourism and transportation on the minimal level; 5) establish a unified administration office to lead the management of the nominated properties and buffer zones (Yancheng Municipal People's Government of Jiangsu Province has approved the establishment of World Heritage Application and Management Office Yancheng Municipality); 6) enhance the protection and management of the nominated properties and buffer zones by integrating the administrative forces of the two nature reserves, one wetland park and two nature reserve plots; 7) use the technical support from the expert group for Yancheng World Heritage nomination, local authorities, monitoring and research institutions, and universities, who will be responsible for the monitoring, protection and management of the nominated properties; 8) promote local legislation to protect the nominated properties and formulate the "Regulations for the Protection of Yancheng's World Heritage Nominated Property”.

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Location of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in China

YS-1: Rongcheng National Nature Reserve, and the Southern Section and Changli Experimental Zone in Rongcheng National Nature Reserve
YS-2: The Middle Section of Rongcheng National Nature Reserve

Location of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in Jiangsu Province

Detailed Map of
Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1)

Detailed Map of
Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2)

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1. Identification of the Property

1.a Country

People's Republic of China

1.b State, Province or Region

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) World Natural Heritage Nominated Properties are located in several counties (districts) in Yancheng Municipality, Jiangsu Province, China as below:

Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1, short for Yellow Sea-1): Sheyang County, Tinghu District, and Dafeng District

Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2, short for Yellow Sea-2): Dafeng District, Dongtai City and Dongsha

1.c Name of Property

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

1.d Geographical coordinates to the nearest second

Table 1-1 Coordinates of the nominated property of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

ID No.	Name of the Component Part	Coordinates of the Central Point
YS-1	Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1)	N 32°55′55″, E 121°1′0.53″
YS-2	Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2)	N 33°33′17.85″, E 120°36′5.46″

1.e Maps and plans, showing the boundaries of the nominated property and buffer zone

Figure 1-1 Location of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in China

Figure 1-2 Location of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in Jiangsu Province

Figure 1-3 Detailed Map of Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1)

Figure 1-4 Satellite image of Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1)

Figure 1-5 Detailed map of Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2)

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Figure 1-7 Map Showing Relationship of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) to the Existing Protected Areas

1.f Area of nominated property (ha.) and proposed buffer zone (ha.)

The total area of the two component parts of Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) is 228,147 hectares, comprising nominated property and buffer zones of 153,174 hectares and 74,973 hectares respectively.

Table 1-2 Area of nominated properties and proposed buffer zones

ID No.	Name of the Component Part	Area of the Nominated Property (ha.)	Area of the buffer Zone (ha)	Map N°
YS-1	Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1)	144,839	28,271	Figure 1-3, Figure 1-4
YS-2	Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2)	43,804	51,785	Figure 1-5, Figure 1-6
Total area (in ha)		188,643	80,056	

Figure 1-1 Location of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in China

Figure 1-2 Location of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in Jiangsu Province

Figure 1-3 Detailed Map of Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1)

Figure 1-4 Satellite image of Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1)

Figure 1-5 Detailed Map of Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2)

Figure 1-6 Satellite image of Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2)

Figure 1-7 Map Showing Relationship of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) to the Existing Protected Areas

2. Description

2.a Description of Property

2.a-1 The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

2.a-1-1 Overall introduction

Migratory Bird Sanctuaries of the Yellow Sea and Bohai Gulf of China are located in the Yellow Sea Ecoregion, which includes the largest inter-tidal flats in the world, and the key habitats in the East Asia- Australasian Flyway.

Fig. 2-1 Map of the WWF Global Ecoregions, and location of the Yellow Sea Ecoregion (shown as red rectangle; Cited from WWF)

The Yellow Sea Ecoregion includes the Yellow Sea, the Bohai Gulf and part of the East Sea, and is located at the transaction zone between Asian Continental and Pacific Ocean. It has been listed as one of the Global Ecoregion 200 by WWF (World Wide Fund for Nature). Its southern boundary lies between Yangtze River estuary of China, and Jeju Island, and Nakdong River Estuary of South Korea. And northern boundary are the coast lines of

both Yellow Sea and Bohai Sea, with the coordinates of N31°40′-N41°00′, E117°35’ -E126°50’. Of which, the Chinese coast lines started from Yalu River Estuary, through Liaoning Province, Hebei Province, Tianjin Municipality, Shandong Province, Jiangsu Province and Shanghai Municipality, with the coastal line length of 6500 km. The total area of the Yellow Sea Ecoregion is 458 million hectares.

The tidal flats of the Yellow Sea Ecoregion are key habitats for millions of migratory water birds of the East Asia Australasia Flyway, which provide stopover sites, wintering grounds and breeding grounds for the migratory water birds. It is estimated that at least 2 million shore birds use the area during the spring (northward) migration, and at least 1 million shore birds use the area during the autumn (southward) migration (Barter 2002: viii). Moreover, the number of threatened species along this flyway is far more than any of the other 7 flyways.

The landscapes and ecological processes along the Yellow Sea-Bohai Gulf coast are shaped by two interacting processes: accumulation of the sediment discharge from rivers in east China, and subsidence of the East Asian continental shelf. Large rivers such as the Yellow River, the Yangtze River and the Huai River, meandering over vast alluvial plain, bring fertile silt and muddy water into the shallow basin of the Yellow Sea. The natural process of sea level change and subsidence has formed the world's largest intertidal mudflats.

Fig. 2-2 Map of Yellow Sea Ecoregion, showing national boundaries, major cities and rivers (Cited from *Shorebirds of the Yellow Sea*)

Migratory Bird Sanctuaries of the Yellow Sea and Bohai Gulf of China is a serial world heritage nomination. 16 sites along the coast of the Yellow Sea and Bohai Gulf will be nominated in 2 phases. The detailed plan and introduction to each site is explained in preface. This document only elaborates Phase I of the serial nomination: Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1), and Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2).

Fig. 2-3 Location of the Yellow Sea Ecoregion in the East Asia-Australasia Flyway, Yancheng tidal flats are shown as unique radial sand ridges extend to 3 million ha (Cited from *Invisible connections. Why migrating shorebirds need the Yellow Sea*.)

2.a-1-2 The status of the nomination of the world heritage in the Yellow Sea Ecoregion

Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China are located in the Yellow Sea ecoregion, which attracts massive attention from the global conservation community. The IUCN World Conservation Congress (Jeju, Korea 2012) unanimously agreed on the “conservation of the East Asian-Australasian Flyway and its threatened waterbirds, with particular reference to the Yellow Sea” (Resolution 5.028), highlighting the global importance of the Yellow Sea. Four years later, the IUCN World Conservation Congress (Hawaii, U. S. 2016) again adopted a resolution on the “conservation of intertidal habitats and migratory waterbirds

of the East Asian-Australasian Flyway, especially the Yellow Sea, in a global context" (Resolution 6.026), recognising the outstanding universal value of the Yellow Sea region. The resolution also suggested to consider the possibility of World Heritage nomination for the intertidal zone of Yellow Sea, to promote its protection and sustainable development.

Republic of Korea submitted to the tentative list of "Southwest ern Coasts Tidal Flats" to the World Heritage Center of UNESCO in 2010, which includes 6 nominated sites: Gochang, Suncheon, Muan, Buan, Boseong, and Sinan. The dynamic of these tidal flats from muddy to sandy driven by monsoon is a prominent feature of global significance. The tidal flats is also key stopovers for about 1,000,000 migratory birds of 300 species, and important breeding sites for threatened species like black-faced spoonbill (*Platalea minor*).

In February 2017, China submitted to the tentative list for World Natural Heritage "The Coast of the Bohai Gulf and the Yellow Sea of China", which covered fourteen key migratory bird sanctuaries scattered in the 6,500 km long coast from Yalujiang Estuary to Yangtze Estuary. The Coast of the Bohai Gulf and the Yellow Sea of China is modelled by the sedimentation of great rivers, like Yellow River, Yangtze River, Yalu River, Liao River, Luan River, Hai River, and continental shelf settlement, during different eras. The large, continuous mudflats and radial sand ridges are unique marine hydrological structures of global significance. These sites are also important stopovers, wintering ground and breeding sites for the most threatened species in the flyway, which attract the attention all over the world.

Fig. 2-4 The nominated properties in the Yellow Sea Ecoregion

There is global significance in the Yellow Sea Ecoregion surrounded by China, Democratic People's Republic of Korea, and Republic of Korea. Compared with other World Heritage sites, there are irreplaceable outstanding values and differences in geography, ecology, biodiversity, as well as conservation and science (for more details see 3.2).

2.a-1-3 The significance of the nominated property among the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China

The nominated properties, Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I), are located in Yancheng where distributes the largest continuous intertidal mudflats of the world, as well as the unique radial submarine sand ridges system. The region is also the most important key stopover for migratory birds in the Yellow Sea Ecoregion. It is estimated that over 40 % water birds in the East Asia-Australasian Flyway use the nominated properties. According to the assessment by East Asia-Australsia Flyway Partnership, the nominated properties ranks top three, out of 1031 key wetlands across the whole flyway, and it gets the highest scores among all sites within Yellow Sea Bohai Gulf costal wetlands. Therefore, It is the optimal and inevitable choice to start the serial nomination from Yancheng, and necessary solutions for the conservation of key migratory birds' sanctuaries and the most characteristic marine hydrodynamic landscape as well as relevant ecosystems.

2.a-2 Introduction to the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

2.a-2-1 Natural geography

2.a-2-1-1 Geographic location

The nominated property is situated in the southwestern part of the Yellow Sea Ecoregion. It contains two component parts: Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1) and Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2).

YS-1

YS-1 ranges from N 32°40′18.862″to 33°11′31.44″;, from E 120°43′50.14″ to 121°18′10.91″, and the central coordinate is N 32°55′55″, E 121°1′0.53″. The main part of YS-1 is within the range of Jiangsu Dafeng National Nature Reserve, the experimental zone of Jiangsu Yancheng National Nature Reserve, Jiangsu Yancheng Tiaozini Wetland Park, Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Jiangsu Dongtai Tiaozini Wetland Nature Reserve Plots. The north boundary starts from Zhugangzha, extends towards east to the north boundary of Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve. The west boundary starts from Zhugangzha, extends towards south along the boundary of reclamation area to Chuandonggang, turns west for 2.18 km, turns southwest to Dongchuan sea dyke, extends along the Chuanxin Road for 2.75 km, reaches the north boundary of reclamation area and turns to east to the Liangduohezha, turns south along the ridge of reclamation area, reaches to the north boundary of Tiaobei 2-12 and then turns east, along the Tiaozini dyke to the Tiaozini Scenic Area and turns west to the esat boundary of Tiaonan freshwater aquiculture, and turns south to the south boundary of Tiaozini reclamation area. The south boundary starts from the south boundary of Jiangsu Yancheng Tiaozini Wetland Park, extends towards east along the south boundary of Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and end at the 21 km east of Tiaozini Scenic Area. The east boundary coincides with the east boundary of Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Dongsha Experiment Zone.

The buffer zone is mainly located on the west (land side) of nominated property. The north boundary starts from the intersection of Zhugangzha and

G228, extends towards east along the river to Zhugangzha. The west boundary starts from the intersection of Zhugangzha and G228, extends towards south along the sea dyke across the river of Dongchuangang, turns west for 2.8 km, turns southeast along X202 road to the boundary of Jiangsu Dafeng National Nature Reserve. From this point, the west boundary extends towards south and turns to X302 when reach the Liangduohe, along the west boundary of Tiaozini reclamation area and end at the south boundary. The south boundary is the south boundary of Tiaozini reclamation area. The east boundary starts from where Zhugangzha enters the sea, extends towards south, extends along the boundary of reclamation area to Chuanxin Road, turns west for 2.18 km and then turns southwest to Dongchuan sea dyke. Starting from this point, the east boundary turns towards southeast along Chuanxin Road, then turns south to the north boundary of reclamation area and then turns east for 2.75 km, turns south and reaches the north boundary of reclamation area and turns to east to the Liangduohezha, turns south along the ridge of reclamation area, reaches to the north boundary of Tiaobei 2-12 and then turns east, along the Tiaozini dyke to the Tiaozini Scenic Area and turns west to the esat boundary of Tiaonan freshwater aquiculture, and turns south to the south boundary of Tiaozini reclamation area.

YS-2

YS-1 ranges from N 32°49′02″ to N 33°11′30″, from E 120°43′32″ to E 121°18′10″, and the central coordinate is N 33°33′17″, E 120°36′05″. YS-2 is located within Jiangsu Yancheng National Nature Reserve.

The North boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards east for 5 km. The west boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards southeast

along the boundary of reclamation area to Xinyanggang estuary and reaches the north boundary of the core area of Jiangsu Yancheng National Nature Reserve. From the south bank of Xinyang Harbor, the west boundary extends 1943 m southwards, turns towards 405 m east of the sea dyke, extends southwards parallel to the sea dyke until the boundary of Dafeng County, extends 100 m southwards to the north bank of Doulong Harbor, then eastwards along the bank until the -3m isobath, and turns southward towards the parallel line 3 km south of the eastward extension of Simaoyou River. The south boundary is the parallel line 3 km south of the eastward extension of Simaoyou River, extending eastwards until 5km offshore. The east boundary is the -3m isobath, which marks the boundary of intertidal zone.

On the east of the nominated property lies subtidal mudflat, where there is no fixed artificial facility. Due to the extremely complicated hydrological condition and unstable radial sand ridges morphology, the mudflat is very dangerous for small boats, and does not allow large ships to approach, so it is not necessary to establish a buffer zone on the east side. The buffer zone is mainly located on the west (land side) of nominated property. The north boundary starts from Huangshagang, extends towards east, turns northeast along the north boundary of the middle section of Jiangsu Yancheng National Nature Reserve to 1.7 km south from Sheyang river estuary. The west boundary starts from Huangshagang, extends southeast along the east side of Huanghuang road, turns south, extends across Xinyanggang along the east side of S331, turns southwest at Zhonglugang, turns south along the Xichao river, turns southeast at Fangqiang Farm along the river, turns east at Dongfanghongqizu, reaches sea dyke road at Doulonggang, turns south to Sanmaoyou river along sea dyke road and G228. The south boundary starts at Sanmaoyou river, extends

eastwards to sea dyke road, and extends northwards along the road to the line 3 km south, parallel to eastward extension of Simaoyou River, and reaches the -3m isobath. The east boundary coincides with the west boundary of the nominated property.

Existing protected areas

Fig. 2-5 The geographical locations of the nominated property, in relation to the two existing protected areas: Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve

Key conservation objects of Jiangsu Yancheng National Nature Reserve include coastal wetland ecosystems, and red-crowned cranes, spoon-billed sandpiper as well as other rare and endangered migratory water birds. It is the largest coastal wetland nature reserve in China, with the coastal line length of 582 km. Major wetland types include permanent shallow sea, tidal flats, salt marshes and artificial wetlands. It was designated as Ramsar site in 2002, under criteria 2, 3, 4, 5, 6 and 7. The site has unique bio-geographic fauna and flora of global importance. Therefore, it was designated as nature reserve of provincial level in 1983, then been promoted as national nature reserve in 1992, and became as one of the network sites of MAB in the same year; a few years late, it was accepted as one of the northeast Asia crane conservation network sites in 1996. In 2002, it was designated as Ramsar Site.

Biodiversity inventory recorded great number of biological species, including 415 species of birds, 47 species of mammals, 30 species of amphibians and reptiles, 199 species of fishes, 86 species of zoo plankton and 498 species of insects, of which 94 species are national key protected species, including 13 first class national protected species, and 81 species of second class national protected species. At least 34 species are threatened species of the IUCN red list, including critically endangered Spoon billed Sandpiper (*Eurynorhynchus pygmeus*), Baer's Pochard (*Aythya baeri*), and Siberian cranes (*Leucogeranus leucogeranus*), and global endangered species Red-crowned Crane (*Grus japonensis*), Oriental White Stork (*Ciconia boyciana*)、Scaly-sided Merganser (*Mergus squamatus*)、Great Knot (*Calidris tenuirostris*)、Far-eastern Curlew (*Numenius madagascariensis)*. It supports the largest wintering migratory population of red-crowned cranes (*Grus japonensis*), with

600-800 individuals wintering here, which accounts for 40-55% of the global migratory population (the highest record of 1200 individuals, accounts for 80% of the global population). Over 3 million shore birds pass through and stop here for 5 to 6 weeks every year, and the number of wintering birds range from 100,000 to 300,000 since 1990s.

Moreover, 285 species of vascular plants have been recorded in the nature reserve, including 5 species of national protected, and formed comprehensive vegetation along the ecological gradients.

Jiangsu Dafeng National Nature Reserve is dedicated for the re-introduction of the deer, and it is adjacent to Yancheng National Nature Reserve. Major objective it to conserve the habitat for the re-introduction of the Pere David's deer. It was designated as the Ramsar site in 2002 due to its importance in supporting threatened species and biological communities (Ramsar Criterion 2). Similar to Yancheng National Nature Reserve, it was designated as provincial nature reserve in 1986, and then promoted as national nature reserve in 1997. In 2002, it was designated as one of the Ramsar Wetland Sites.

Biodiversity inventory recorded 204 species of birds, 150 species of fishes, 27 species of mammals, 21 species of amphibian and reptiles and 80 species of insects. Among which 31 species are on the list of national protected species. Pere David's Deer is the dominate mammal species, which grown from 39 individuals that were introduced from UK in 1986, and now the population has been grown up to 4556, which is a species listed as extinct in the wild by IUCN. However, with the effort of the nature reserve, this species has not only expanded its populations, but also re-introduced into the wild habitat, and the wild population has also grown to 905 individuals. Besides, the nature reserve

has also recorded 170 red-crown cranes and 50,000 of other wintering water birds.

Jiangsu Dafeng National Nature Reserve recorded 227 species of vascular plants that belongs to 159 genera and 53 families. The tidal flats are featured with forests, vegetated tidal flats. Key vegetation types include salt meadows, marsh vegetation, submerged plants, shrubs and deciduous forests.

2.a-2-1-2 Geology and topography

YS-1 and YS-2 are less than 30km apart, with similar conditions of geology, topography, climate, hydrology and soils. So these aspects will be introduced as a whole in the following paragraphs.

(1) Geological structure

The tectonic structure where Jiangsu coast is located on Huabei (North China) platform and Yangtze quasi-platform, approximately with near northeast Huaiyin-Xiangshuikou fault as boundary. Since the Tertiary, Huabei Platform mainly have showed rise of fault block, developing a series of NE-SW direction faults. Since Mesozoic Southern, Yangtze quasi-platform have mainly showed sedimentation process, developing a whole set of platform type stratum mainly made up of marine carbonate and clasolite from the Sinian system to Triassic system, and forming a large scale continental deposit basin on the basis of Indosinian-Yanshan folding, namely the Subei-South Yellow Sea basin. The heritage nominations mainly locate Subei geotectogene to the north of Tangzte quasi-platform. Over long geographic period, the geotecogene develops slowly from west to east, to south Yellow Sea, with range of subsidence increasing from west to east. Different range of subsidence everywhere forms a series of geotecogene and uplift, among then

Dongtai geotecogene is the deepest and largest.

The framework of geographic structure in Subei-South Yellow Sea is controlled by NNE and WNW fault groups, the next are NE, NW. Some are large scale deep major fracture which controlled sedimentation since Late Tertiary, which also became the boundary line of new structure and topography in the region. The Quaternary neotectonics has the nature of blocking elevating and sinking. Jiangsu coastline is roughly NW direction, controlled by NW major fault and South Yellow Sea major fault.

Fig. 2-6 Distribution of fracture in Jiangsu

(2) Characteristics of stratum

Except Archeozoic stratum at Shiqiao, Qinshan Island of Ganyu and Proterozoic stratum at Houyuntai Mountain, east, west Liandao, other regions of Jiangsu are almost covered by quaternary sediment, Cenozoic stratum develops completely, with total thickness up to 3,500 m. Thickness of stratum varies with position of geographic structure, typically thicker at deep sag and

thinner at convex location. The thickness of coast at Sheyang, Dafeng and Dongtai are the thickest and up to 300 - 400m. The stratum of abandoned delta of Yellow River and the middle coastal marine deposition plain of the heritage nomination locates features as follows:

Abandoned delta of Yellow River is mainly the delta deposit formed when Yellow River seized the estuary from Huai River, which is Holocene series (Q_4) deposition made from gray-yellow silty clay and silty clay. The clay texture is very homogeneous, and the particles are very fine, free of the coarse particles such as silty sand and fine sand. It has the characteristics of sediment in the mud bay. The clay includes two layers: upper layer is solidified because of exposure to the earth surface and long term evaporation; lower layer is ooze, still in semi-plastic state. At its bottom shall be estuary deposition of ancient Huai River.

Fig. 2-7 Change of Yellow River Bed for the past 2000 years

Middle coastal marine deposition plain develops towards the sea in the mode

of sand reef-lagoon, with marine and lagoon deposition widely distributed. Ancient seashore sand levee and ancient lagoon extend in south-north direction, distribute and rank alternately in east-west direction, develop towards the sea parallel to modern coast. The thickness of Holocene series (Q_4) deposit is 10 – 40 m. Its upper section distributes at the line of Zhongshan River to Pincha-Xiaoyangkou, being grey yellow clayey silt; middle section is gray, gray black sub-clay, mainly containing silty sand, mixed with ooze or fine sand, being shallow sea-coastal deposition formed under warm and hot environment and large scale transgression; lower section is dark gray clay, silty sand and sandy loam, belonging to lagoon estuary deposition. Depth of upper Pleistocene series (Q_3) deposit is 15 – 70 m, thickness is 15 – 80 m. From the north of Sancang River in Dongtai City to Guanhe estuary, upper layers are dark gray loam, sandy loam, silty and fine sand, lower layers are dark gray silty and fine sand, alteration of loam and sandy loam. In the south of Sancang River, upper layers are versicolor loam mixed with gray silty and fine sand, coarse sand of ancient gravel, lower layers are slate gray, grayish brown, green yellow loam and gray silty, fine sand, and coarse sand containing gravel, middle layers are mainly gray silty, fine sand, sandy loam. Depth of middle Pleistocene series (Q_2) deposit layer is 40 - 160m, thickness is 30 - 150m. From the south of main Subei irrigation channel to the north of Shuangyanggang line, the majority is brown yellow loam, mixed with gray silty, fine sand; from Shuangyanggang to Fangqiang town, dark gray loam, clay and ooze type loam are mixed with yellow medium, fine sand layer; from Fangqiang town to Dongtai River, there are grey silty clay and sandy loam, alteration of powder and sand; from the south of Gongtai River to Tongyuan Haimen City-Sanjia Qidong, upper section are gray fine, medium sand and medium, coarse sand containing gravel, mixed with loam layer, lower section

are brown yellow, grayish green clay, alteration of loam and gray silty, fine sand.

Radial sand ridges in Jiangsu coast are located in Subei-South Yellow Sea depression zone. Strong Mesozoic, Cenozoic tectonic movement formed large scale sedimentary basin, with thick Mesozoic, Cenozoic deposit. A set of limestone and mud stone deposited in Paleozoic and Triassic; Indosinian movement in late Triassic makes Subei-South Yellow Sea depression a northeast trumpet-like basin, grayish green sandy mudstone and argillaceous sandstone deposited in Jurassic, in cretaceous red clastic stone, purple sandstone and sandy mudstone deposited; in Cenozoic Himalayan movement sank the depression zone dramatically, forming 2,000m thick gray, brown sandstone and mudstone, versicolor mudstone intercalated with sandstone.

(3) Geomorphic characteristics

Geomorphic types of the nominated properties include coastal marine deposition plain and radial sand ridges intertidal belt shoal wetland.

Coastal marine deposition plain, extended to the east of Chuanchang River, distributed from the north from Sheyang riverside at southern edge of Huanghuai delta, to the south to northern edge of Yangtze River delta, about 50km wide. It is a long and narrow vast marine deposition plain formed through constant expending for nearly one thousand years. The plain was submerged as shallow sea by the last transgression of Quaternary. To the sand levee outside east bank of Lixia River Plain, it became land successively. The young plain just formed 2,000 - 3,000 years ago is still constantly expanding towards the sea, which is indicated mainly by continued eastward advancement of seashore at Dafeng, and formation of a large scale

radial sand ridges in the east of Luegang. Altitude of the ground of coastal plain is between 1.5 m and 4.5 m, slowly declining from southeast to northwest. Hai'an, Dingyan Rugao city, Rudong region is the joint of sand spit at north bank of Yangtze River and coastal plain, is the highest. From here toward north, its relief lowers gradually to about 1m at Sheyang riverside. East coastline of the coastal plain is straight, there is vast tidal beach and radial sand ridges outside coast. Due to low relief, all rivers entering the sea are uplifted by tide, water flowing slowly, meander developed. Meander topography development is typical, especially at major rivers such as Sheyang River, Xinyanggang, Doulonggang, etc.

The coast at coastal plain region is the most typical silty sandy tidal beach in Jiangsu, on tidal beach tidal furrow develops commonly, with high water level mud beach, medium water level silty sand-ooze beach, low water level silty sand-fine sand beach distributing in sequence from coast to sea. From Longgang to Donggang there are at least four significant ancient coastal sand levees and ancient lagoons extending in north-south direction, alternately ranking from west to east. The region is flat overall, the highest altitude is near Jianggang, gradually lowering towards south and north wing. With Dongtai River as boundary, it is divided into south section and north section roughly, from north to south, tidal beach widening gradually. In north section (Sheyang River estuary-Dongtai River estuary), the beach is 5 km wide in average, in south section (Dongtai estuary-Beiling estuary) the tidal beach is the widest in Jiangsu. The widest beach near Jianggang Dongtai is about 14 km wide. If it is calculated by combining coastal high beach including sand ridges, namely calculated from Luegang-Tiaozini-Gaoni-Zhugensha, tidal beach is up to 40 km wide.

Another topographic form is sand ridges radial with Jianggang as the center. Radial sand ridges is a rare, unique coastal topographic form worldwide, extending 200 km in south-north direction, 140 km in east-west direction. There are total more than 70 underwater sand ridges whose height, form are different from each other. Between sand ridges are quirks which is steep and deep. The radial shoal is the most special undersea sand ridges worldwide, which is called “sea labyrinth”, is of significance in coastal science and marine geology, covering more than 20 thousand ha, being a major foraging site of migratory birds during low tide period. Radial shoal intertidal zone shallow beach wetland submerges during tide, emerges during low tide. There is rich mollusk resource such as *Bullacta exarata*, clam, etc. There are rich shrimps and small fishes near waterline which are important food for migratory birds.

Fig. 2-8 Distribution of geomorphic types along Jiangsu coast

2.a-2-1-3 Climate

In the transitional zone between northern subtropical zone and warm temperature zone, Yancheng is with significant features of monsoon climate, which is being different obviously between south and north. Within coastal zone it is warm climate, with annual average air temperature between 13-

15℃. Due to adjustment of the ocean, it is warmer in winter half year and cooler in summer half year in shoal beach comparing to adjacent inland. Annual accumulated temperature with daily average air temperature no less than 0℃, is 4,900-5,100℃ in the north of the channel, 5,100-5,450℃ in the south of the channel. The closer to the sea, the longer frost-free period, however, frost free period in mudflat is 5 - 10 days longer than it in adjacent inland.

Rain and heat are synchronizing in the same season, with annual average rainfall of 900-1,000 mm. Influenced by monsoon climate, in the region torrential rain occurs frequently, inter-annual variation of rainfall is significant, seasonal distribution is uneven, with most rainfall occurring from June to September every year, during which rainfall accounts for 60%-70% of annual rainfall. Annual average evaporation in coastal region is between 1,400-1,700 mm, decreasing gradually from south to north. Relative air humidity varies with season, with relative humidity up to about 85% in July and August, and dry in autumn and winter. Annual relative humidity increases progressively from north to south, 70%-78% in the north of the channel, 80%-81% in the south of the channel.

Annual sunshine hours ranges from 2,100 to 2,650 along the coast and annual global solar radiation is up to 460-527 J/ (cm^2.a). In north of Subei irrigation general channel, annual global sun radiation is 494-527 J/(cm^2.a), sunshine hours is 2,400-2,650; in south of the general channel, annual global sun radiation is 460-5,494 J/(cm^2.a), sunshine hours is 2,100-2,400. 60% annual global sun radiation concentrates between mid-May and mid-September, in most time annual global sunshine hours decrease from south to

north, especially in spring (March to May) difference between south and north is most significant. Only from late July to late August, sunshine hours increase obviously from north to south.

Typhoon is a disastrous weather occurring frequently and most harmful in the region. Encounter of typhoon and astronomical tide can result in storm surge. Influenced by monsoon, many torrential rains occur in Yancheng, 3 - 4 torrential rains on average every year. Torrential rain mainly occurs from June to September, heavy rainfall mainly occurs in July and August, in accordance with the time of typhoon occurring, and most typhoon itself can bring downpour and heavy rainfall.

2.a-2-1-4 Hydrology

In the nominated properties, there are dense network of waterways, abundant rivers with rich runoffs. Annual average runoff depth at Yancheng is 288.1 mm, ranging 240-340 mm, distributing differently between in south and north regions. Its trend is basically in accordance with isogram of average rainfall in the same period, decreasing from south to north, northwest. The junction of Dafeng, Dongtai coast is the zone of large runoff depth, which is more than 340mm. The rivers in the region typically have max runoff in July to August, with summer runoff accounting for 70%-80% annual runoff. Average annual runoff into Yellow Sea is more than 200×10^8 m^3, rivers into the sea carrying sediment about 526×10^4 t/a. Evaluated value of average groundwater resource for multiple years in Yancheng is 215.596 m^3, influenced by sea water invasion, fresh water distribution in coastal region decreases progressively from north to south.

Rivers flowing into the sea through the nominated properties include Xinyang

River, Doulong River, Aimaoyou River, Chuandong River, Liangduo River, etc. Because the nominated properties locate near estuary, except a few small-sized plain reservoirs, there is no lake, but large area coastal wetland distributes at the nominated properties, with natural wetland mainly distributing at intertidal zone outside coastline, belonging to silty sand-ooze coastal wetland; artificial wetland mainly distributing at the zone 5 km from coastline to land, with majority being fishpond and salt field.

Fig. 2-9 Distribution of Rivers in the nominated properties

2.a-2-1-5 Soil

Soil development of Jiangsu coast where the nominated properties locates is controlled by influence of two basic factors such as succession of ecological type of coast and variation of coastal morphological landscapes. Except regional mountainous brown soil developed by bedrock type Yuntai Mountain low mountains and hills and Shajiang black soil at coast of Ganyu county, in other plain coast, in the intertidal zone outside sea levee various coastal saline soil develops, inside the sea levee moisture soil distributes.

Coastal saline soil mainly distributes outside the sea levee at silty sand ooze type coast, salinity inherits natures of sea water, mainly containing chloride, pH between 7.5 to 8.5. Coastal saline soil can be subdivided into beach saline soil, meadow coastal saline soil and marsh coastal saline soil based on different tidal covering frequency, different soil forming process. Beach saline soil distribute in whole intertidal zone below high water level of major tide, in initial development stage of coastal saline soil. It maintains features of soil parent material, without layer difference, soil total salt>0.6%, phreatic water salinity >20g/l; above average high water level salt tolerant *Suaeda salsa*, Salicornia can grow, organic matter content more than 0.5%; below average high water level, no higher plant grows, soil organic matter typically less than 0.5%. Meadow coastal saline soil typically distribute between above high water level and sea levee, being the most advanced stage of intertidal zone coastal saline soil development; its soil parent material is not influenced by sea water basically, soil total salt between 0.1%-0.6%, salinity between 4-12g/l; grasses such as cogon grass, *Aeluropus littoralis*, *Zoysia macrostachya*, etc, grow on the beach, with topsoil organic matter content about 1.0%. Marsh coastal saline soil is the product of swampiness and de-

swampiness of soil in the ecology of intertidal zone marsh; marsh mainly includes reed marsh, *Spartina anglica* marsh, *Spartina alterniflora* marsh, etc., with soil salt content 0.2-0.8%, topsoil organic matter content above 1.0%, deeper organic matter profile distribution.

Frequently affected by such factors as artificial cultivation, irrigation and drainage, meadow coastal saline soil forms soil during cultivation and ripening. It mainly distributes at coastal reclamation zone, featuring topsoil being ripened from original shallow organic matter accumulation layer into agricultural horizon; subsoil becomes light colored, with lime deposit of, rust spot more obvious; bottom soil has rust spot, rust streak, obviously influenced by lifting effect of ground water capillary. Moisture soil is divided into two subgroups, one forms in subtropical mist climate zone, developed nu Jianghuai sediment, called gray fluvo-aguic soil, which mainly distributes in Nantong city and the south of Yancheng, with majority being light loam-medium loam; topsoil salt content below 0.2%, soil organic matter content about 1%; the other forms in warm temperature zone semi-mist climate zone, developed by Yi and Shu river sediment, called brown moisture soil, which mainly distributes at north coast, with alternation of sandy layer and clay layer, low organic matter content, soil salt content below 0.1%.

2.a-2-2 Shift of coastline

Except deeper thalassocratic sea water invasion in Holocene, the nominated properties region was roughly steadily in Ganyu, Banpu, Funing, Yancheng to Hai’an region for long time, forming several long shore bars near coastline, among which, Xigang, Zhonggang and Donggang are the most famous. Xigang starts from Ganyu Zhengyuan in the north, through Guanyun Dongfeng, Yangzhai, Longang to Xinghua, then south through Anfeng till to

the west of Hai'an, the sand levee formed about 7,000-5,000 years ago. Zhonggang starts from Ganyu Luoyang, Dasha, through Lianshui Tangji, Guanyun Qingshan and Guannan Xin'an, south to Yongfeng, then through Dafeng Sanxu and Xinghua Heta into Hai'an, connected with Yangtai Gushagang, which formed 4610±100 years ago. Donggang starts from Ganyu Fankou, Dasha, in the north, through Guanyun Xiache, Guannan Chengtou, Binhai Pangang and Jianhu Shanggang, the south through Goudun, Yancheng, Caonian and Dongtai into Hai'an region, the sand slevee had formed 3,300-3,900 years before and began to emerge more than 2,000 years ago at latest. In addition, in Sheyang Xintan-Yancheng Nanyang-Dongtai Sizao region, there is an ancient sand levee buried relatively deeply, which began to form about 1,000 years ago, emerging out of the sea surface in 15th century at the latest, becoming and natural sign of coastline in mid Ming dynasty. In 1023-1027 of Beisong dynasty, Fan Zhongyan built a Hanhaiyan, in later more than 30 years, the seawall built at coast under now Nantong was connected in to a wall from north of Funing, directly to Lusi, hundreds of Li long, becoming an artificial symbol of Jiangsu coastline in about 1,000 years ago.

Since 1128 the Yellow River seized estuary of Huai River, north section and middle section of Jiangsu coast advances siltation gradually. And since 7th year of Hongzhi Ming dynasty (1494) Yellow River took over Huai River whole basin, siltation speeds up greatly, coast moves east quickly. During 1128-1855, either the rate of estuary extension or delta growth, or land forming rate of coastal plain, is divided into two stages obviously: before 1494, siltation growth rate of Yellow River estuary is 54m/a; after taking over Huai River whole basin in 1494, estuary extension rate increased to 215m/a. Large

amount of silt brought into sea by Yellow River not only directly formed Subei Yellow River delta, but also formed vast coastal plain in the bay along two wings of the delta through effect of tide, wave.

North return of Yellow River in 1855 made Jiangsu coast experience another change of opposite dynamic silt condition, the source of large amount of silt was cut off, re-adjusting the coast and underwater shoal. During 1855-1890, from north of Biandan estuary to Yunyan estuary violent erosion retreated, from south of Biandan estuary to Yangtze River estuary siltation maintained; in later 30 years, the coast between obsolete Yellow River estuary and Sheyang estuary continued to be eroded, but less quickly. The coast in north of obsolete Yellow River estuary accepted eroded silt and entered siltation process, but later the coast also turned to be eroded, south section of coast constantly kept siltation; Yancheng coastline where the nominated properties locates evolves as follows since 1970s: the coastline from north of Huai River estuary to the junction point of Binhai and Sheyang is steady, the coastline in south of the section is mainly siltation type coastline, coastline section fron Sheyang estuary to Changshagang (Dayanggang) keeps higher speed of siltation towards sea.

Fig. 2-10 Sketch of Gushagang Profile

Fig. 2-11 Changes of Coastal Shoreline of a History Period in Jiangsu Province

Fig. 2-12 Erosion and siltation variation of modern Jiangsu coastline

2.a-2-3 Coastal wetland

Wetland types mainly includes intertidal zone natural wetland influenced by tide and artificial wetland. Natural wetland includes estuary zone planar water system, mudflat, reed salt marsh, *Suaeda salsa* salt marsh, *Spartina lterniflora* salt marsh, tidal creek, etc. Artificial wetland includes paddy field, various shoal culture ponds (sea water aquaculture pond and fresh water aquaculture pond). Wetland of the nominated properties shows the feature of extensive continuous distribution, its upper boundary is the boundary of natural distribution of wetland, lower boundary is edge of mudflat.

Fig. 2-13 Wetland type distribution of Jiangsu coastal area

2.a-2-4 Marine hydrology

2.a-2-4-1 Tide

When Yancheng tidal wave transmits from the Donghai Sea to Yellow Sea, it maintains the characteristics of progressive wave in south coast. When continuing north movement, due to reflection of Shandong Peninsula coast, it forms levorotary spiral waves. The amphidromic point of south Yellow Sea M2 partial tide is near N34°30′N, E121°10′. So Yancheng is mainly controlled by two tidal wave systems, crest line of these two tidal waves converge outside Jianggang wall, tidal wave convergence zone increases tidal range due to concentration of tidal wave energy, with M2 partial tide increasing by about 1.5m. In north Jiangsu coast, except that the tide is irregular diurnal tide near amphidromic point, in most of the rest is irregular semi-diurnal tide, in a small part of region it is regular semi-diurnal tide; in south sea area it is regular semi-diurnal tide due to influence of progressive wave transmitted from Donghai. Average tidal range in south sea area of Jiangsu coast is largerm between 2.5-4 m, and the sea area from qionggang to Xiaoyangkou is the area of max tidal range in the sea area, with average tidal range up to more than 3.9 m, gradually decreasing both to south and to north with Jianggang as the center. In Yancheng coast where the nominated properties locates, in the waters north of Sheyang estuary, except that in the sea area north of Lianyungang mainstream direction is WSW-ENE, in the rest most is NNW-SSE; tidal current is relatively weak, with average velocity of major tide is 1.2-1.3 kn; velocity of the largest egre current is up to 2.5 kn, max velocity of ebb current is up to 2.7 kn. In the sea area south of Sheyang estuary, west side of Dongsha is a strong current area, with average velocity of major tidal current more than 3kn, mainstream direction basically parallel to coastline; in east

side of Dongsha average velocity of major tidal current is about 2 kn, mainstream direction is mostly NNE–SSW, velocity of max egre current may be up to 3.8 kn near Wanggang, velocity of max ebb current is up to 3.6kn.

Fig. 2-14 Cotidal chart of north Jiangsu

2.a-2-4-2 Wave

In the nominated properties, northern waves prevail in whole year, most of which is stormy wave dominant compound wave. In south main direction of the wave is ENE, frequency is 8%, direction of strong wave is NW and N; in north In south main direction of the wave is ENE, frequency is 14%, direction of strong wave is NE. Autumn is the season when stormy wave prevails most, in September in the north of the sea area average max wave height is 2.9m, in south is 3.0m, annual variation of average wave height and average period is insignificant.

The wave at shoal outer edge and coastal zone outer side is larger than those near shore, wave height 3m isogram basically distributes along contour lines of shoal zone, about 20km from the shore. Wave height increases quickly from shore to sea. There are 3 major wave zones near the area where water

is about 15-20m deep, whose centers locate obsolete Yellow River estuary, Sheyang estuary and the place 200km at east of Qionggang, with max wave height up to 9m; in inner side of radial sand ridges only breaker wave crossing shoal appears, so wave weight is minor, no more than 2 m at most. In the sea area there are 5 wave convergence zones: from Guanhe estuary to Zhongshan estuary; obsolete Yellow River estuary; south of Biandanhe estuary; south of Sheyang estuary; Lusi and Qidong coast. Due to refracting effect of wave, in above 5 regions wave height increases, and when wave approaches breakage, normal included angle of wave ray and coastline is larger, resulting in coastal erosion of different degree or different form.

2.a-2-4-3 Sediment

Water bodies in the nominated properties are rich in sand. Sand content distribution features that sand content near shore is higher, forming a high value zone, sand content decreases gradually towards external sea. Sand content of water body near shore is related to stormy wave and tidal current, erosion effect of sediment suspension due to shallow water stormy wave, strong tidal current between sand ridges on bottom and side slop, all can increase sand content of sea water. In north sea area of radial sand ridges, sand content of major tide water body is above 0.1-0.2 kg/m^3 in summer, above 0.3-0.5 kg/m^3 in winter, while near shore, dynamic effect is strong, loose deposit is rich at shore side, resulting in vertical average sand content of sea water up to 1.0-2.5 kg/m^3, (Xinyanggang to Wanggang coast section). In south sea area of radial sand ridges sand content decreases gradually, outside Xiaoyangkou sand content of major tide water body is 0.4-1.3 kg/m^3, Lvsi at Xiaomiaohong is 0.2-0.7 kg/m^3. Suspended sediment content seasonally changes obviously, it is several even tens of times higher in winter

than in summer, related to interaction of circular current near shore resulting from monsoon effect. In Yancheng sea area suspended sediment mainly consists of clay and silty sand, gain size is typically larger in major tide period than in minor tide period, grain size of quick egre and ebb is typically larger than that of slow egre, ebb, corresponding to dynamics of egre and ebb.

2.a-2-4-4 Temperature and salinity

Average lowest temperature of coastal waters in the nominated property occurs in February: surface min water temperature in south sea area is 4.9℃, bottom temperature is 5.1℃; in North Sea area surface min temperature is 4.4℃, bottom temperature is 4.5℃. Jiangsu coastal waters max monthly average water temperature occurs in August: in south, North Sea area surface temperature is 27.4℃ and 26.8℃ respectively, bottom temperature is 26.0℃ and 24.2℃ respectively. Middle radial sand ridges sea area has characteristics of shallow water zone, range of annual water temperature variation of both upper layer and lower layer is up to 26℃, compared to whole sea area, and it is 1.0-1.5℃ lower in winter, about 3.0℃ higher in summer. In autumn and winter water temperature is lower near the shore higher far from the shore, in spring and summer is higher near the shore lower far from the shore.

Coastal waters are influenced by land runoff obviously, range of monthly average salinity variation is between 29.53-32.24, during low water season (December to the coming May) salinity is higher (31.32-32.22), in summer, autumn (June to November) salinity is lower (30.60-31.06), range of annual

salinity variation is about 9.7.

2.a-2-5 Radial sand ridges

(1) Morphological Characteristics of Sand Ridges

Radial sand ridges distributes at sea area of outer side of middle coastal zone of Jiangsu, south continental shelf of Yellow Sea, in north from Sheyang estuary, south to Haozhigang at north of Yangtze River estuary. It crosses in south-north direction ranging N32°00′-N33°48′, 200 km long; it crosses in east-west direction ranging E120°40′-E122°10′, about 140 km wide, covering about 2.8×10^6 ha. Generally with Jianggang as vertex, with Huangshaoyang as main axis, it radiates from the shore to the sea like an unfolded fan, made up of many ridges and tidal current passages separating sand ridges. Ridges distribute alternately, water is 0 – 25 m deep mostly, and individual quirk is up to 38m deep at most. Radial sand ridges is a general name of shoal that radially distributes and emerges out of sea surface, sand ridge concealing undersea, and tidal current passage between shoals or sand ridges. A large number of important information about the coastal environment evolution since the late glacial period is stored in the radiation bar, which is an important carrier to study the global environmental change and the interaction between land and sea.

Radial sand ridges are composed of more than 70 sand ridges and tidal current channels. The ridges vary with different shapes, and the ridges are separated by steep and deep grooves. Each sand ridge is different in size, width and length. The main large muds involve Tiaozini, Dongsha, Liangyuesha, Taipingsha, Maozhusha, Waimaozhusha, Jiangjiasha, Niujiaosha, Hetunsha, Taiyangsha, Huoxingsha, Lengjiasha and Yaosha.

They basically radially distribute within a sector with Jianggang as the center, centre angle 150°, extending in N, NE, E and SE direction, ridge and quirk alternating. Top of sand ridges is cut by quirk, with smaller sand body, multiple forms, appearing disordered; but the part other than top develops well. In the sea area in north of Jianggang , water is shallow, slop is slow, sand ridge body is large and continuous, and it distributes densely, with shallow quirk; in south sea area, water is deep, ridge is narrow and quirk is deep, sand ridge body is small and scattered. As sand ridge extends externally, altitude decreases, and gutters between sand ridges become from narrow to wide, from shallow to deep, with discontinuous quirk or deep pool in the gutter. North sand ridges are higher in west and lower in east, and south sand ridges are higher in southwest and lower in northeast. Radial sand ridges bottom materials are mainly fine sand, silty sand and muddy silty sand, deposit of sand ridge top is coarse, deposit at tail is finer. Strongly effected by tidal current, stormy wave, radial sand ridges separate, merge, disappear and grow, vary complicated. But generally they merge and expand, moving towards the shore. The shoal in the center of radial sand ridges or near shore are mostly in the state of gradually silting and rising, with silting rate about 2-8 cm/a, maximum is around 10 cm/a. The coastal part of the majority of sand ridges is exposed at low tide and becomes a sandbar with an area of 22,470 km^2, of which the area above 0 m is 3,782 km^2.

Fig. 2-15 Scope of Radial Sand Ridges

Fig. 2-16 Distribution of radial sand ridges

(2) The material of radial sand ridges

The most important source of material for the sediment is provided from Yellow River and Yangtze River. The sediment from Yellow River is mainly silt with clay, however, the sediment from Yangtze River is fine sand and silty clay. The main components of radial sand bar are fine sand with fine separation, the content is more than 90%, and the surface depressions contain silty sand. The inner segment and middle section of tidal current channel are fine sand; In addition, the content of silty sand increased in the middle section of the outer segment, mouth and some large tidal current channel, and the content of silt in the northern tidal channel increased more than that in the south. It is found that the main body of radiation sand ridge is the fine sand material of the Yangtze River system, and the fine particles of clay and silt are obviously supplied by Old path of the Yellow River (north) and Yangtze River (south).

(3) The origin and evolution of radiation sand ridges

Abundant sediment and long-term stable special radial tidal current are the sufficient and necessary conditions for the formation and development of radial sand ridges in the South Yellow Sea. The radial sand ridges are the accumulation landforms under the action of tidal currents.

Researchers found that in the offshore of China, the velocity of flow is 1 - 3.5, and a depth of less than 35 m can form sand ridges. The rectilinear current ranged from 1 – 3.5 kn and rich loose deposit are the dynamic and material conditions of tidal ridge development. In the offshore of Jiangsu Province, the flow velocity ranges from 2 – 3 kn, and there is a large amount of loose deposit material, which has the condition of the formation and development of radial sand ridges.

In the process of advancing the south Pacific tidal wave in the North Yellow Sea, some of sandbars are blocked by the peninsula. With the interactions between anticlockwise rotation wave and South Yellow Sea's subsequent wave, an independent mobile wave system is formed in the open seas of Jiangsu Province.The tidal wave is restricted by the horn shape near the Jianggang, and it is rapidly advancing to the shore at a speed of about 100 km/h. Under the control of the mobile wave in the tide, the flood tide flows come from the north, northeast, east and southeast to the shore of the Jianggang River at high tide, and spread out in a 150° fan angle with the center of Jianggang.

After the Holocene sea invasion, it formed a small accumulation of sand body in the north east of the ancient Yangtze River estuary, which is the prototype of radiation sand ridges. In the process of the rising of the Holocene sea

surface, the tidal current erosion formed a long strip sand ridge, and gradually formed the south wing of radial sand ridges. Because the sediment is mainly from the Yangtze River, the south of the radial sand bar is significant. With the enhancement of radial tidal current, the radial sand ridges with a certain scale and roughly the north - south symmetry with East Platform as the apex are formed. In 1128, the Yellow River took the Huai River into the sea, and the amount of sediment increased greatly. With the interaction of tidal current and bank flow, the radiation sand bar grew rapidly.

Due to the gradual south bias of the Yangtze estuary, the sediment of the southern radiation sand ridges was gradually reduced, that forming a small asymmetric and huge radial sand bars. After the Yellow River returned to the old course, the whole radial sand ridges, especially the sand ridges in the north of Jianggang, lost the rich sediment supply of the Yellow River. At the same time, the Yangtze River estuary was moving southward, and the sediment supply of the Yangtze River is greatly reduced. The erosion of the land and the underwater part of the ancient Yellow River delta became the main source of material. Therefore, the whole radiation sand ridges had a tendency to migrate to the southeast, and this internal adjustment had been in progress.

Fig. 2-17 Tidal flat and creeks of Jiangsu Coastal area

(4) The dynamics of radial sand ridges

In the submarine region of radial sand ridges, the tidal current is strong and tidal range is large. The Dongsha flats are fragmented by the complex of tidal channels. However, Dongsha still looks like integrated vast flats at low tide because of the size over tens of thousands hectare.

On the *Comprehensive survey of coastal and tidal flats survey in Jiangsu*, Dongsha is the largest single tidal flat among the radial sand ridges system. Its size above 0 m of sea level exceeds 69,000 ha, and the size above middle tidal level is around 20,000 ha. The western end of Dongsha flat is 16 km away from the continent.

Fig. 2-18 Historical changes of Dongsha sand ridges

The sediments constituting radial sand ridges have two origins: 1. Sediments from the former Yellow River Estuary (existed from 1194A.D.-1855A.D.), and 2. Sediments from the Yangtze River Estuary of geologic time (before the late Pleistocene), which flew into Yellow Sea from Jianggang.Sediments from modern Yangtze River exert no influence on the radial sand ridges.

Because of the reclamation, the tidal channel between Dongsha and the

continent have been narrowed down. The tidal current consequently becomes strong and fast. A study by Nanjing University via remote sensing reveals that the western edge of Dongsha flat is eroded by the current continuously, while storm tides shrink its eastern edge. With the expansion of water channels, the Dongsha flat tends to move southeastwards gradually.

2.a.2-6 Biodiversity and Habitat

2.a.2-6-1Biogeography of the nominated properties

Bio-geography of the nominated properties belong to Oriental Deciduous Forest province of the Palearctic Realm (numbered 2.15.6, Udvardy, 1975), featured fauna and flora of temperature zones. It also belongs to Yellow Sea Ecoregion of WWF Global Ecoregion 200 classfication (number 203, WWF, Fig. 2-1).

2.a.2-6-2 Ecosystems

i. Habitat types

According to the global habitat classification by IUCN species survival subcommittee, the nominated properties consist of five habitats (Table 2-1).

Table 2-1 Habitat Types of the nominated properties (according to IUCN/SSC)

First-level IUCN / SSC Habitat	The nominated properties
1 .Forest	
2. Savannah	
3. Shrubland	
4. Grassland	●
5. Wetland	●
6. Rocky barren areas	
7. Caves & Subterranean	
8. Desert	

First-level IUCN / SSC Habitat	The nominated properties
9. Sea	●
10. Coastline/Intertidal	●
11. Artificial-Terrestrial	
12. Artificial-Aquatic	
13 .Introduced Vegetation	●

ii. Ecosystems

Tidal flats ecosystem is consists of supratidal zone, inter tidal zone and subtidal zone. Such ecosystem structure has been maintained by the tidal from the Yellow sea, and the sediments from rivers, in particular, the Yangtze River and Yellow River. Due to huge amount of sediments transported by the Yellow River and Yangtze River during the past thousands of years, the tidal flats of the Yellow Sea ecoregion has been extended from the coast line to the sea, and formed 3 million ha of tidal flats, which is the largest tidal flats in the world.

The supra-tidal zones feature with salt marshes, and consist of plant communities dominated by *Imperata cylindrica, Zoysia macrostachys, Suaeda salsa* and *Phragmites australis.* Freshwater marshes are mainly reeds community with the height of 150-250 cm, and the coverage rate of 60-70%, and mainly distributed at low wetlands and river estuary. Vegetation succeed from Suaeda communities to *Zoysia macrostachys* communities and then *Imperata cylindrica communities.* Besides, *Artemisia alkali* communities, *Angiospermae* communities, *Salicornia europaea* communities occasionally appear at the sites. Since 1980s, Spartina, an invassive species, which originally introduced from USA, has been spread along the coast lines. The invassive spartina has been out compete Suaeda communities, and hence caused negative impact on habitat qualities, in particular, for Suaeda gulls, and red-crowned cranes.

Fig. 2-19 Distribution of typical vegetation in the nominated properties

Fig. 2-20 Typical ecosystem types in the nominated properties

Dongsha Mudflat

Overlook of the nominated property

Marshes

Suaeda glauca

Phragmites australis

Eurynorhynchus pygmeus

Grus japonensis

Paradoxornis heudei

Grus japonensis

Egretta intermedia and *Egretta alba*

Elaphurus davidianus

Hydropotes inermis

Boleophthalmus pectinirostris

Philyra pisum

Periophthalmus modestus and *crabs*

Fig. 2-21 Wetland Ecosystem -consists of sub-tidal zone, inter-tidal zone, and supra-tidal zone (vegetated tidal flats), where sediments and nutrients have been exchange with the help of the tidal, and maintained ecosystem processes, as well as ecosystem services.

2.a.2-6-3 Vegetation

Flora of the nominated properties belongs to warm temperate deciduous broad-leaf forests and subtropical evergreen broad-leaf forest. It can be classified within two major sub-zones, namely deciduous oak forests of the south warm temperate zone, and north subtropical mixed evergreen broad-leaf forests deciduous broad-leaf forests.

i. Flora character of genera

There are 7 families, 7 genera and 10 species of ferns, 2 families, 6 genera and 8 species of gymnosperm, and 70 families, 217 genera and 306 species (subspecies and variety) of angiosperms. The plant genera recorded in the nominated properties can be classified into the 13 vegetation distribution types. The flora distribution are mainly consists of 43 genera of world wide distribution, 47 genera originated from pan-tropical region, and 43 genera originated from north temperate region, which represent a clear transition from pan-tropical to temperate climate zones.

ii. Vegetation types and its distribution

Five vegetation types recorded in the nominated properties, e.g., coastal salt soil vegetation, salt marsh vegetation, brackish water vegetation, and salt water aquatic vegetation.

Coastal salt soil vegetation

Salt soil vegetation distribution follows the soil salt content gradient from the sea to inland, and form a complete vegetation distribution spectra.

(1) *Suaeda glauca* (Bunge) Bunge community

Mostly dominated by single species, and occasionally accompanied by *Salicornia europaea.* It mainly distributes at tidal flats along the coast, from Xichao River Estuary to Sanbu Bridge of Sheyang County, and Zhonglu Harbour to Sanli Sluice Gate of Dafeng District, as well as the Dongling re-reclamation region of Dongtai County. Suaeda community coverage rate along the tidal flats ranges from 10 to 40%.

(2) *Zoysia macrostachys Communities*

Zoysia macrostachys is the main grassland species, and often develop the community with Spartina, an invassive species, together with *Imperata cylindrica* (Linn.) Beauv. *Phragmites australis* and *Suaeda salsa.* It mainly distribute at south of the Qionggang of Dongtai city, and Zhugang north of Dafeng District.

(3) *Aeluropus sinensis* (Debeaux) Tzvel． Community

It is the transitional vegetation between *Suaeda salsa* community and *Zoysia macrostachys.* It is one of the key grassland species, and have often been grazed by Chinese river deer *(Hydropotes inermis*) . Accompany species include *Suaeda salsa, Zoysia macrostachys* and *Phragmites australis.*

(4) *Imperata cylindrica* community

This community is widely distributed within the nominated properties, with some aggregation at from north of Qionggang of Dongtai city to Wanggan of Dafeng District. Species composition is rich, consists of many species and sub-groups of species, such as *Aeluropus sinensis*, *Zoysia macrostachys, Calamagrostis epigeios* (L.) Roth）, *Apocynum venetum* L. Corex, spp. and *Phragmites australis*.

(5) *Artemisia capillaries* Community

Salt Marsh Vegetation

(1) *Spartina alterniflora* Loisel. Community

It was introduced from USA, and has great tolerance to salt. It has been wide spread along Chinese coast since 1990s. The invasive species has been taking space from *Suaeda salsa,*and endangered red-crowned cranes, as well as Suaeda's gull habitat. The community has been dominated by the single species, with occasionally with *Apartina anglica* Hubb.

(2) *Carex scabrifolia* Steud. community

It is one of the pioneer species of the river estuary, often distributed at the low

elevation area of the supratidal flats, as well as the brackish water affected shore lines.

(3) *Scirpus planiculmis* Fr．Schmidt community

It mainly distributed at the river estuary between reeds marshes and water surface. It is also come mixed with Suaeda communities when freshwater intrude.

(4) *Typha angustifolia* community

It occasionally distribute at the nominated properties at the lowest wetland areas, often mix with reeds.

Brackish Water Vegetation

Brackish water vegetation mostly seen at tidal flats of the estuary. Most common species are *Phragmites australis*.*Scirpus validus* Vahl, *Scirpus* × *mariqueter* Tang et Wang and *Scirpus planiculmis.*

Salt Soil Vegetation

Often with simple community structure, and mainly distribute at the salt pan, and creeks.

(1) *Ruppiaceae* communities

Mainly seen at the edge of salt pan, or abandoned salt pan, some times seen at the creeks of the suprtidal flats. If salt content decreased, this community will be replaced by *Myriophyllum verticillatum* L.

(2) *Myriophyllum verticillatum* L. Communities

Common at the freshwater water body in the nominated properties, but can tolerate salt to some extend and distribute at the pond, as well as the creeks. However. With the decrease of water salt content, this community will be replaced by *Potamogeton crispus* L.

(3) *Potamogeton crispus* L.

Mainly distributed at the creeks in the nominated properties.

iii. Endemic groups or species

Among the whole 217 genera, only one is endemic to Jiangsu coast, e.g., *Glehnia.* Besides, there are 9 endemic species to China.

Table2-2 Endemic higher plant in the nominated properties

No.	Species	Category
1	*Limonium sinense*	Endemic
2	*Limonium bicolor*	Endemic
3	*Limonium ranchetii*	Endemic
4	*Glycine soja*	Endemic \ National Class II
5	*Scirpus mariqueter*	Endemic
6	*Vitex trifolia*	Endemic
7	*Zoysia macrostachya*	Endemic
8	*Platycodon grandiflorus*	Endemic
9	*Glehnia littoralis*	Endemic \ National Class II

Fig. 2-22 Picture of Endemic Species

Fig. 2-23 The distribution of plant in the nominated properties

2.a.2-6-4 Fauna

i. Fauna Composition

At least 680 species of vertebrates have been recorded at the nominated properties, including 415 species of birds, 26 species of mammals, 9 species of amphibians, 14 species of reptiles, 216 species of fishes, and 165 species of zoobenthos.

(1) Birds

According to field survey in 2017 and the records of two reserves, 415 species of birds have been recorded, which belong to 53 families and 19 orders. Most species rich orders are Passeriformes, with record of 158 species (38.07%), then Charadriiformes (60 species, 14.46%), followed by Anseriformes (38 species, 9.16%), Falconiformes (36 species, 8.67%), Lariformes (25 species, 6.02%), Ciconniformes (22 species, 5.30%), and Gruiformes (16 species, 3.86%)。

Table 2-3 IUCN Red Listed Species recorded at the nominated properties

Order	Species	IUCN Category
1	*Aythya baeri*	CR
2	*Grus leucogeranus*	CR
3	*Eurynorhynchus pygmeus*	CR
4	*Ciconia boyciana*	EN
5	*Mergus squamatus*	EN
6	*Grus japonensis*	EN
7	*Numenius madagascariensis*	EN
8	*Tringa guttifer*	EN
9	*Gorsachius goisagi*	EN
10	*Platalea minor*	EN
11	*Calidris tenuirostris*	EN
12	*Pelecanus crispus*	VU
13	*Grus vipio*	VU
14	*Larus saundersi*	VU
15	*Egretta eulophotes*	VU
16	*Melanitta fusca*	VU
17	*Clangula hyemalis*	VU
18	*Coturnicops exquisitus*	VU
19	*Podiceps auritus*	VU

Order	Species	IUCN Category
20	*Anser cygnoides*	VU
21	*Anser erythropus*	VU
22	*Aythya ferina*	VU
23	*Calidris tenuirostris*	VU

Remarks：CR: Critically Endangered；EN: Endangered；VU: Vulnerable

Among the 415 bird species, 36 are resident species (8.67%), 60 are summer resident species (14.46), 123 are wintering species (29.46%), 210 species are passing migrating species (50.60%). Besides, there are 66 species breeding at the nominated properties (15.90%).

At least 23 species are threatened species (checked from IUCN Red Listed species, 2016), including 3 critically endangered (CR), 8 endangered (EN), 12 vulnerable (VU) (Table 2-2).

With reference to another assessment results by East Asia-Australasia Flyway Partnership, Jiangsu Yancheng National Nature Reserve ranked top three among 1030 key wetlands of the flyway that across 22 countries and regions (Table 2-3). However, if the score take into consideration of the whole Yellow Sea-Bohai Sea, namely, northern Bohai bay, Yellow River Delta, and Geum (Kum) estuary.

Table 2-4 The most important wetlands along the East Asia-Australasia Flyway

Order	Country	Wetlands	Contribution to the EAAF
1	China	Poyang Lake	1056
2	Australia	Eighty Miles Beech	677
3	China	Jiangsu Yancheng National Nature Reserve	417
4	Russia	Moroshechnaya Estuary	392
5	China	East Dongting Lake National Nature Reserve	386
6	Russia	Darwul Nature Reserve	372
7	Cambodia	Prek Toal	294
8	China	North Bohai Bay	285
9	South Korea	Geum (Kum) Estuary	259
10	China	Shengjing Lake National Nature Reserve	245
11	Bangladesh	Tangua Haor Complex	222
12	USA	Yukon-Koskwen Delta	216

13	China	Yellow River Delta	215

IUCN identified 16 key habitats for the East Asia-Australasia Flyway (IUCN 2013), including 7 sites from the Yellow Sea-Bohai Sea region, and Yancheng coast is on the list.

Fig. 2-24 Distribution of the key habitat for the East Asia-Australasia Flyway. Red colored sites for Yellow Sea-Bohai Sea region, and green-colored sites for the South-east Asia and Hongkong SAA of China.

Cited from IUCN situation analysis on East and Southeast Asian intertidal habitats, with particular reference to the Yellow Sea (including the Bohai Sea)

Outstanding and representative species of birds from the nominated properties:

(i) Red-crowned crane (*Grus japonensis*）

Red-crowned crane is one of the giant waders, and the endangered species in the world. New estimation of the global population ranges between 1450 to 1550. The highest record of red-crowned crane population at Yancheng was 1200, however, due to both climate change, and habitat degradation, wintering population at Yancheng reduced to 500 to 600, a bit share of the Chinese wintering population stay at Yellow River Delta, a few hundred kilometers north of Yancheng.

(ii) Spoon-billed sandpiper (*Eurynorhynchus pygmeus*)

It is one of the most endangered birds in the world, with the global population less than 400, and has been listed as the critically endangered species by IUCN. The highest record of this species in Yancheng was 221 in 1991. It can be sighted every year, with flocks of 10 to 20.

(iii) Reed parrotbill (*Paradoxornis heudei)*

This is an endemic species to China, and inhabit reeds along the Chinese coast, lower reaches of Amur River.

Grus japonensis, *Grus grus* and *Grus monacha*

Eurynorhynchus pygmeus

Paradoxornis heudei

Fig. 2-25 Outstanding and Representative Birds from the nominated properties

Fig. 2-26 Distribution of Red-crowned crane in the nominated properties

Fig.2-27 The distribution of avian habitat

(2) Mammals

The nominated properties have recorded 27 species of mammals that belongs to 6 orders and 12 families, of which most are rodents. However, two species have global significance that worthwhile to mention here. The first one the Pere David's Deer, which was re-introduced from the UK in 1986 with the help of WWF International. This species was originally distributed in the lower reaches of Yellow River, and middle and lower reaches of Yangtze River, but had been as the main game animal in the history, but eventually been driven to extinction in the wild. Only a small population were reserved in the zoos in Europe. In 1986, 39 Pere David's Deer were introduced in Dafeng District of Yancheng Municipality, and the population grow steadily at the nature reserve, with the population exceed 4500, among which 905 have been fully released to the nature habitat in the coast area of Yancheng.

Another mammal species worth to mention is the Chinese River Deer (*Hydropotes inermis).* It was also widely distributed in southern China and Eastern China. However, due to loss of habitat, its distribution area has been shrunk to only Yancheng tidal flats, Hongzhe Lake of Jiangsu, Poyang Lake, as well as the Zhousan archipelago. It is estimated its population is around 3-4 hundreds in Yancheng tidal flats.

Fig. 2-28 Distribution of Pere David's Deer in the nominated properties

Elaphurus davidianu

Hydropotes inermis

Fig. 2-29 Representative mammals from the nominated properties

(3) Amphibians

Nine species of amphibians have been recorded in the nominated properties, which belongs to one order and four families. One species, *Pelophylax nigromaculatus* is on the red list of IUCN threatened species as the Near threatened species.

Fig. 2-30 Representative amphibian species, *Pelophylax nigromaculatus*

(4) Reptile

Most recent monitoring shows there are 14 species of reptiles in the nominated properties, among which 8 species are snakes, 5 species are lizards, and the last one is tortoise, which is a vulnerable species from the IUCN Redlist.

(5) Fishes

Recent inventory revealed 216 species of fishes, among which, 14 are on the threatened species list of IUCN.

Table 2-5 IUCN Red Listed Species recorded at the nominated properties

Orders	Latin Names	IUCN Threatened Categories
1	*Acipenser sinensis*	CR
2	*Sphyrna lewini*	EN
3	*Aetobatus flagellum*	EN
4	*Carcharias taurus*	VU
5	*Alopias vulpinus*	VU
6	*Cetorhinus maximus*	VU
7	*Carcharodon carcharias*	VU

Orders	Latin Names	IUCN Threatened Categories
8	*Carcharhinus plumbeus*	VU
9	*Sphyrna zygaena*	VU
10	*Squatina japonica*	VU
11	*Narke japonica*	VU
12	*Platyrhina sinensis*	VU
13	*Beringraja pulchra*	VU
14	*Hippocampus trimaculatus*	VU

Fig.2-31 Representative fish species, *Acipenser sinensis*

(6) Zoo-benthos

Recent inventory revealed 165 species of Zoo-benthos. Zoobenthos play a role of material transformation and energy transfer in wetland ecosystem, and their ecological value is very important. Benthic fauna is the main source of food for many migratory waterbirds, and it is an important factor to determine the number of birds. The number of benthic animals is positively correlated with the number of coastal birds feeding on it. At the same time, maintaining the functional integrity of benthic community is of great significance to maintain the ecological system function of heritage nomination.

Intertidal Zone
Subtidal Zone
Dominant Species of Macrobenthos
Polychaeta
Tylorrhynchus heterochaetus
Dentinephtys glabra
Notomastus lotericeus
Lamellibranchia
Mactra veneriformis
Crustacea
Portunus trituberculatus
Gastropoda
Bullacta exarata
Umbonium thomasi
Lamellibranchia
Mactra veneriformis
Meretrix meretrix
Crustacea
Portunus trituberculatus
Macrophthalmus dilatatum
Gastropoda
Bullacta exarata
Umbonium thomasi
Lamellibranchia
Mactra veneriformis
Meretrix meretrix
average density: 21 individuals/m2
species: 4
average density: 40 individuals/m2
species: 6
average density: 30.85 individuals/m2
species: 9
Spartina habitat
tidal creek habitat
mudflat habitat
high water spring
Spartina
Beach
Note: Asterisk indicate the species with higher density
low water spring
ocean

Intertidal Zone
Subtidal Zone
Marsh
Dominant Species of Macrobenthos
Polychaeta
Tylorrhynchus heterochaetus
Goniada japonica
Lamellibranchia
Glauconome chinensis
Polychaeta
Tylorrhynchus heterochaetus
Goniada japonica
Glycera chirori
Lamellibranchia
Mactra veneriformis
Polychaeta
Tylorrhynchus heterochaetus
Goniada japonica
Glycera chirori
Gastropoda
Bullacta exarata
Lamellibranchia
Glauconome chinensis
Mactra veneriformis
average density: 92.5 individuals/m2
species: 8
average density: 58.4 individuals/m2
species: 12
average density: 21.6 individuals/m2
species: 10
Spartina habitat
tidal creek habitat
mudflat habitat
high water spring
Spartina
Beach
Note: Asterisk indicate the species with higher density
low water spring
Ocean

Fig. 2-32 Representative Zoobenthos from the nominated properties

2.b History and Development

2.b-1 Nature History

Yancheng has very long history. Changes of Land and Sea in Yancheng since 70,000 years ago. The situation of geology and landform in Xiahe Plain, Huanghuai Plain and Binghai Plain has been formed by geologic process and climate change. They made from the sand and soil blow by strong wind and transport by Yangtze River, Yellow river and Huai River. 20,000 yr BP, at the end of late Pleistocene, and the Last Glacial Maximum. According to China's cold and arid climate and marine regressions, Huanghai continental shelf was exposed and a terrace sequence was formed. Hongzehu lake and west bank of Gaoyou Lake was the first stage terrace, east of Fangongdi was the second-stage terrace, which elevation is 13-20 meters higher relative to the first stage terrace. The boundary of Yacheng city was hundreds kilometers away from coastline, Yancheng used to be an inland city. Archaeologists have found many late pleistocene fossils of horns, teeth, and body from *Elaphurus davidianus, Cervus axis, Hydropotes inermis,* and *Sus scrofa* in Dafeng, Tinghu, Jianhu and Dongtai. The alveolar stones (tafone) which formed at 50,000 yr BP have been found in the river mouth of Sheyang. All these fossils indicate that there were inland forests, grasslands, wetlands and lagoons in Yancheng area 10,000 to 20,000 years ago.

Fig. 2-33 The alveolar stones (tafone) found 27 meters underground in the river mouth of Sheyang.

2.b-2 Human History

In Tang Dynasty, Yancheng is one of the most important port and strategic pass of China. According to the new and old "History Tang Dynasty”, the monk of Koryo, Feng Dasheng, the prince of Silla, Kingshixin and the Japanese emissary MASATO AWADAN all went to Chang’an or left China through Yancheng. For encouraging navigation, Haichunxuan tower was built at Dongtai, the southern part of Yancheng in Tang Dynasty. For guarding the custom, an ancient “scaling ladder” was built at Xiangshui, the northern part of Yancheng where was an ancient river mouth of Huai river. The Tang Dynasty scaling ladder is called the first custom in Jianghuai Plain.

Fig. 2-34 Haichunxuan tower, built in Tang Dynasty.

Fig. 2-35 The Tang Dynasty scaling ladder which is called the first custom in Jianghuai Plain.

Fangong Sea Wall: In 2nd- 6th yr of Song Dynasty (Between 1024-1028 A.D.), people have built a 75-kilometer-long rocky sea wall which is 10 m weight at the base, 3.3 m at the top and 5 m high. This sea wall was very useful for wave resistance, the saline-alkali soil has become good farmland after that. Thanks to the sea wall, more residents in Yancheng, Xinghua and Hailing had better development on farming and salt business. After completed the

Fangong Sea Wall, there is long period till the Yellow river change its riverway to Huai river.The agriculture in the western part of this sea wall named Xialihe area has developed quite well. In Earlier Song Dynasty, this area has rich soil and famous for its tea, salt and silk cloth which supplied big sum of tax for the Song government. Thousands of households have settled down here. In Song Dynasty, they expanded and strengthened the sea wall from south to north day by day. Finally, the sea wall was 400 km long from Lusi to Miao bay. It was a great water conservancy project in northern Suzhou. At the same time, canals were built in this area. It also helped the salt business and agricultural irrigation. After the Fanning Sea Wall was built, the people who used to move out of Yancheng were coming back for farming and salt manufacturing.The GDP attained historic peak levels.

In 1128, the Yellow river change its course to Si River and Huai river by first time. Because of the river way's changes and floods, good farmlands in this area covered by sand and small rivers and canals blocked. The agriculture economic depression. Soil and sand were also brought to the ocean by Yellow river which made the coast shift to the east. Salt business has deteriorated too.

In the early Qing Dynasty, salt business still existed. Thousand kilometers of coast beach contribute suitable habitat to wildlife. Hundreds and thousand mammals and birds moved around. Hunters were followed. Hunting became a good business, more than 2,000 households live on that. People started to use wild birds’ feather to made fans, duvets and jackets. But because of the coast kept moving east, people live on had to move to the east. The old saltern became farmland. In mid and late Qing Dynasty, the government helped to discover new salterns and revitalization salt industry.

Fig. 2-36 Map of salterns in Qing Dynasty

2.b-3 The conservation history of nominated heritage

The Yellow Sea-Bohai Sea Wetlands include Jiangsu Dafeng National Nature Reserve, the experimental zone of Jiangsu Yancheng National Nature Reserve, Jiangsu Yancheng Tiaozini Wetland Park, Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Jiangsu Dongtai Tiaozini Wetland Nature Reserve Plots. Since the establishment of two nature reserves, the government at all levels has attached great importance to the development of the nature reserve management. With the strong support of the government at all levels, the protected areas have developed rapidly, and the establishment of the regional management service has also developed. It has been accepted as MAB network member by UNESCO Man and Biosphere Program, northeast Asia crane protection area network by Asia Pacific Migratory Water Birds Conservation Committee, and Ramsar site by ramsar Convention secretariat, etc., which has played a positive role in the development of nature reserves.

Table 2-6 Historical events of the conservation history in Yancheng

Time	Events
1983	**Nature reserve was set up by Jiangsu Provincial Government**
1985	Surveying and mapping of the nature reserve
1986	Set up of Jiangsu Dafeng National Nature Reserve
Mar., 1988	nature reserve management policy issued
1990	“Land Use Rights Certificate” issued to Yancheng Nature Reserve
Oct., 1992	Yancheng Nature Reserve graded up to national nature reserve
Nov., 1992	Yancheng National Nature Reserve joined to the World Network of Biosphere Reserves and named “Yancheng Biosphere Reserve” by UNESCO
1995	Jiangsu Dafeng National Nature Reserve. joined to the World Network of

Time	Events
1983	**Nature reserve was set up by Jiangsu Provincial Government**
	Biosphere Reserves and named “Biosphere Reserve” by UNESCO
1996	Yancheng National Nature Reserve joined North-east Asia Crane Conservation Network
1997	Jiangsu Dafeng National Nature Reserve graded up to national nature reserve
2002	Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve designated as Ramsar Site
2002	“The management laws of Yancheng National Nature Reserve” promulgated
2003	Jiangsu Dafeng National Nature Reserve joined the EAAFP
2006	Changed the area, range and function division of Yancheng National Nature Reserve
2012	Boundary and zoning of Yancheng National Nature Reserve adjusted by State Council
Sep., 2014	Yancheng National Nature Reserve joined International Alliance of Protected Areas
Oct.2016	Set up of Jiangsu Dongtai Tiaozini Wetland Nature Reserve Plots
Oct.2018	Set up of Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots
Jan.2019	Set up of Jiangsu Yancheng Tiaozini Wetland Park

In recent years, the two nature reserves have established excellent cooperative partnership with local authorities, primary schools, and many universities, thus two nature reserves have become the bases for the ecological education and moral education of many institutions. Many organized events, such as "Bird-loving week", "Fight for the King Deer", were held in these years. Many bird-watching organizations had carried out bird observation in the areas of nominated properties, which promoting the protection of the environment and ecological awareness among the local community residents, students, teachers and institutions involved in the activities.

Through the above-mentioned activities, we hope to protect the wildlife habitat, restore the population, improve the ecosystem function, establish a monitoring system, and enhance the local residents' ability to protect and manage natural resources. The authority of the two nature reserves also provides financial support, protection planning, and evaluation of the effectiveness of the community.

Paulson Institute observed the Pere David's Deer

Dr Liu Bin and his students went birdwatching

Pere David's Deer popular science activities

Bird-loving week jointly organized by Nature Reserves and Dafeng forest public security in 2017

Fig. 2-37 Conservation activities of nominated heritage

3. Justification for Inscription

3.1.a Brief synthesis

The Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China consist of natural landscapes such as deltas, sandbanks, mudflats, saltwater/freshwater marshes, rocky shores, islands and ancient coastlines, as well as salt pans, fish ponds and rice paddies, ranging from the Yalu River estuary to the Yangtze River estuary. The coast of Yellow Sea-Bohai Gulf contains the world's largest continuous mudflat seashore. Sediments and nutrients are continuously discharged from the Yellow River and Yangtze River (two of the world's longest ten rivers) and other rivers including Yalu River, Liao River, Luan River and Hai River, and form fertile mudflats, radial sand ridges and sandbanks. These intertidal landforms, together with sand dunes, lagoons, rocky shores, and islands, provide diverse habitats for migratory birds. Nowadays, the dynamic process of river sediment discharge and continental shelf sedimentation continues to shape the geological landscape and ecosystem on the Bohai Gulf-Yellow Sea coast, making it one of the most diverse and fertile coasts in the world, and fascinating habitats for migratory birds on the East Asian-Australasian Flyway.

In recent years, the Yellow Sea ecoregion has raised continuous high attention from all over the world. The IUCN World Conservation Congress (Jeju, Korea 2012) unanimously agreed on the "conservation of the East Asian-Australasian Flyway and its threatened waterbirds, with particular reference to the Yellow Sea" (Resolution 5.028), highlighting the global importance of the Yellow Sea. Four years later, the IUCN World Conservation Congress (Hawaii, U. S. 2016) again adopted a resolution on the "conservation of intertidal habitats and migratory waterbirds of the East Asian-

Australasian Flyway, especially the Yellow Sea, in a global context" (Resolution 6.026), recognising the outstanding universal value of the Yellow Sea region. The resolution also suggested to consider the possibility of World Heritage nomination for the intertidal zone of Yellow Sea, to promote its protection and sustainable development.

The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a serial nominated property ranging from Northeast China to East China, providing key stopovers, wintering grounds or breeding grounds for multiple threatened migratory bird species, constituting one of the world's most diverse and magnificent temperate coastal landscapes and ecosystems, and an indispensable part of the global biodiversity conservation. The serial nominated property are key stopovers, wintering grounds or breeding grounds for some of the world's most noticed threatened bird species, including two critically endangered water birds: the Chinese crested-tern (*Thalasseus bernsteini*) with the global population just more than a hundred, the spoon-billed sandpiper (*Eurynorhynchus pygmeus*), with only hundreds of individuals left in the world. Almost all individuals of the Nordmann's greenshank (*Tringa guttifer*), the great knot (*Calidris tenuirostris*), and the Far Eastern curlew (*Numenius madagascariensis*) depend on these habitats.

The Migratory Bird Sanctuaries along the Coast of Yellow Sea- Bohai Gulf of China will be submitted to apply for the inscription on world heritage list in three phases, and the Phase I includes two component parts: 1) Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1) and 2) Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2). The two components are separated by the Dafeng Port and the surrounding areas with dense human activity, with their boundaries about 30 kilometers apart. The East Asian-Australasian Flyway Partnership assessed the importance of 1030 reserves

and migratory bird habitats on the flyway. The results showed that the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast, and are thus suitable for the first phase of the nominated property.

1) Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1). The component part covers an area of nominated property 144,839 ha, plus a buffer zone of 28,271 ha on the west. Dafeng contains typical habitat types of secondary forest on marine deposition plain and freshwater reed marsh. The southern section of Yancheng Reserve and Dongsha embody the complete ecosystems of intertidal mudflats, radial sand banks and sand ridges. Dafeng is home to the world’s largest captive population and largest reintroduced population of Père David's deer (or milu, *Elaphurus davidianus*). The southern section of Yancheng Reserve, Dongsha, Tiaozini and Gaoni provide an important stopover site for the waders on the East Asian-Australasian Flyway. Half of the world’s spoon-billed sandpipers and Nordmann's greenshanks make long stopovers, feed, or even moult in the nominated property and surrounding areas.

2) Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2). The component part is located in Sheyang County, Tinghu District, Yancheng Municipality, Jiangsu Province, containing the core area in the middle section of Jiangsu Yancheng National Nature Reserve. The area of the nominated property is 43,804 ha, plus a buffer zone of 51,785 ha on the west. The middle part of Yancheng Reserve mainly consist of habitat types of freshwater reed marsh and intertidal mudflat. It provides the most important wintering ground for the migratory population of red-crowned crane (*Grus japonensis*), with about 50% (in some years 80%) of individuals spending the winter here each year.

The area involved in the nominated property above constitute the largest intertidal flat on the west bank of Pacific Ocean. Within the two component parts, large tracts of coastal habitats remain less disturbed by human activity, retaining the natural ecosystem structure and functions, becoming one of the natural coastlines rare in this country and the world. The main body of the marine deposition plain and mudflat is formed before 1855, when Yellow River changing its course back to the north. Nowadays, the intertidal mudflat is still mainly in the process of accumulation under the special marine hydrological conditions. The above process has shaped the crucial habitat for threatened species such as the red-crowned crane, the spoon-billed sandpiper and the Nordmann's greenshank in the nominated property. These habitats, together with other sites along the Chinese coast to be nominated in the future, form indispensable links in the conservation network for more than 20 threatened bird species on the East Asian-Australasian Flyway.

3.1.b Criteria under which inscription is proposed

According to the *Operational Guidelines for the Implementation of the World Heritage Convention*, the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) are nominated under the criteria (ix) and (x).

Justification for inscription under these two criteria is as follows:

(ix) be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;

Since the Pleistocene, great rivers such as the Yellow River and the Yangtze River have been endlessly flowing into the Yellow Sea and the Bohai Gulf,

carrying massive material from the Qinghai-Tibet Plateau and the Central Asian desert. On the other hand, the continental shelf in Yellow Sea and Bohai Gulf have been in the process of continuous subsidence. Accumulation of river sediment discharge and tectonic subsidence, combined with marine hydrological processes and climate change, have jointly shaped the natural landscape along the Yellow Sea and Bohai Gulf coast, forming the basis for the occurrence and evolution of ecosystems.

The nominated properties have long been under the influence of the Yangtze River, the largest river in Asia. Between A.D. 1194 and 1855, the Yellow River, with the largest known sand discharge, used to enter the sea near the nominated properties. The nominated properties are located in a region where the river (terrestrial) and marine ecosystems interact intensely, probably the most typical of its type in modern times. A large amount of river sediment discharge interacts with the ocean current to form intertidal mudflats and unique radial sand ridges.

During the sea transgression and regression since the late Pleistocene, the sediments discharged from the ancient Yangtze River estuary and Huai River estuary have accumulated to form more than 30,000 km^2 of radial sand ridges centered at Jianggang, under the influence of special radial flow in the coastal waters of Yellow Sea. Radial sand ridges, sand banks and tidal channels constitute the largest part of the nominated property. Radial sand ridges have always been changing under the intense influence of tidal currents and storms, but the general trend is to merge and expand, and to move toward the shore. Sand banks in the middle of the radial structure or close to the shore are mostly accumulating and growing. The dynamic changes of these landscapes driven by changes of river and marine hydrology and climate have become the major driving forces of the evolution of ecosystems and even

species. It is in order to feed on the diverse benthic animals living in such dynamically changing habitats that the waders here undergo adaptive divergent evolution.

YS-2 is mainly plains formed by marine deposition. Due to the tidal asymmetry (fast flood tides and slow ebb tides), the sediments transported by tides can be accumulated in the intertidal zone. This is an important driving force for the formation of the plains. Large rivers discharge into the southern Yellow Sea a large amount of sediments, which are then suspended and transported by tides and waves to be deposited in the intertidal zone. Meanwhile, the coastal plain continuously silts up, advancing to the sea, forming unique intertidal mudflats. The vegetation zones in the nominated area shows remarkable characteristics of coastal wetland vegetation: with changes of soil salinity and seawater submergence, the vegetation structure in the nominated area shows obvious transition and clear succession. From the sea side to the land side, the transition types are: mudflat with no vegetation, Spartina alterniflora marsh, Suaeda glauca marsh, Aeluropus sinensis grassland, Imperata cylindrical grassland or reed marsh. On the most salty mudflats with no vegetation live the most abundant benthic animals, which provide rich food resources for migrating birds. On the land side of the mudflats, Spartina alterniflora communities exist in some areas. Further toward the land side grow salt-tolerant plants, such as Suaeda glauca and Salicornia europaea. In the areas with salinity as low as 0.6% -1.0%, the amount of Aeluropus sinensis increases in the Suaeda glauca community. The type of vegetation that appears furthest toward the land side is Imperata cylindrical grassland, often accompanied by Setaria viridis, Artemisia capillaris, reeds Phragmites communis, Zoysia macrostachya and other plants. In addition, large reed communities distribute in water-rich areas, such as lower mudflats and the estuarine zone. These areas often used by birds

such as red-crowned cranes. The spatial distribution of habitat types and vegetation communities change with the dynamic changes of the muddy shore, forming the basis for the maintenance of biodiversity.

Fig. 3-1 Zonation of wetland vegetation and landscape in the nominated property

These two nominated properties not only represent the typical characteristics of the coastal and marine ecosystems and their changes in landscape pattern, but also highlight the evolution of their plant communities against the background of the dynamic changes in coastal landscape. At the same time, their ecosystem supporting services also fully reflect the ecological and physiological processes in various organisms related to adaptation and evolution, making the area an outstanding example of coastal and marine ecosystems.

(x) contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing

threatened species of Outstanding Universal Value from the point of view of science or conservation.

The Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China concentrates threatened bird species and their habitats of global concern, and has outstanding value in conservation and scientific research. These areas are located on the East Asian-Australasian Flyway, where the number of threatened waterbird species is much higher than the other seven major flyways in the world. Moreover, the first phase of the serial nomination involves the flyway's highest-rated reserve and key habitat for threatened birds.

The nominated properties are located in the south of Yellow Sea Ecoregion (#203 in the WWF Global 200 Ecoregions), containing the world's largest continuous mudflat seashore, already listed as important wetlands in the Ramsar Convention. As one of the best preserved intertidal mudflats, Jiangsu Yancheng National Nature Reserve has joined UNESCO's Man and Biosphere reserves network. The area features rich biodiversity, providing key stopovers, breeding grounds and wintering grounds for millions of migrating waterbirds on the East Asian-Australasian Flyway.

Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1) is located in the central keynode range of East Asian-Australasian Flyway, 7000 kilometers apart from both the breeding and wintering grounds of waders, and thus serves as an indispensable stopover and "gas station". For waders, YS-1 and the vast surrounding area is the largest and the most important stopover on this flyway. The radial sand ridges and surrounding areas where Dongsha is located are the autumn stopover and moulting ground for more than 50% of spoon-billed sand pipers, a globally critically endangered species. The tidal channels in the radial sand ridges are habitats for the migratory fish Japanese

grenadier anchovy (*Coilia nasu*), and the representative fishes of the Yellow Sea, large yellow croaker (*Larimichthys crocea)* and yellow croaker (*Larimichthys polyactis*), as well as important feeding grounds for the critically endangered Chinese sturgeon (*Acipenser sinensis*). At low tide, the sand banks emerge from the sea, providing breeding ground for massive benthic animals, and feeding grounds for critically endangered birds like spoon-billed sandpiper and Far Eastern curlew. In addition, Dafeng is currently home to more than two-thirds of the global population of wild Père David's deer, providing a model for reintroduction and rewilding of large mammals after extinction in the wild.

Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2) is an important habitat for the critically endangered species Baer's pochard (*Aythya baeri*) and Siberian white crane (*Leucogeranus leucogeranus*). It is also the most important wintering ground for the endangered species red-crowned crane (*Grus japonensis*), with the wintering population accounting for more than 40% - 55% of the species' migratory population. Meanwhile, the nominated property is also a stopover site for about 10% of the population of the endangered species black-faced spoonbill (*Platalea minor*), and one of the important breeding and wintering grounds for the vulnerable species Saunders's gull (*Larus saundersi*).

Table 3-1 Bird species with 1% of the global population depending on the nominated property

Order	Latin name	IUCN category
1	*Eurynorhynchus pygmeus*	CR
2	*Platalea minor*	EN
3	*Ciconia boyciana*	EN
4	*Grus japonensis*	EN
5	*Tringa guttifer*	EN
6	*Calidris tenuirostris*	EN
7	*Egretta eulophotes*	VU

Order	Latin name	IUCN category
8	*Pelecanus crispus*	VU
9	*Anser cygnoides*	VU
10	*Larus relictus*	VU
11	*Larus saundersi*	VU
12	*Calidris canutus*	NT
13	*Limnodromus semipalmatus*	NT
14	*Limosa limosa*	NT
15	*Numenius arquata*	NT
16	*Limosa lapponica*	NT
17	*Calidris ferruginea*	NT
18	*Charadrius leschenaultii*	LC
19	*Charadrius mongolus*	LC
20	*Arenaria interpres*	LC

Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) provide irreplaceable habitats in the conservation of threatened birds like red-crowned crane and spoon-billed sandpiper, a precious example of the reintroduction of Pere David's deer, and feeding grounds for endangered fishes. The nominated properties have outstanding value for international biodiversity conservation.

3.1.c Statement of integrity

The Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China involve large tracts of mudflats, beaches and other habitats connected to them through the migration of birds, consisting the largest coastal migratory bird habitat system, serving as key stopovers for bird migration between the two hemispheres and an important part of the East Asian-Australasian Flyway. The vast space provide high quality rest stops for more than a hundred species and millions individuals of migratory waterbirds, to replenish the fat they need for the continued flight.

Differences in natural history and landscape result in varied habitat conditions across the vast space along the Yellow Sea-Bohai Gulf coast. Different threatened species select different sites for congregation. Certain species also selects different sites during different seasons or different phase of their

lifecycle. The sites of serial nomination will insure the survival of all threatened species when they pass the ecoregion, and constitute an integrity of habitat networks.

Phase I of the serial nomination include all the intertidal wetlands undisturbed by human activity, including two existing nature reserves, one wetland park, two nature reserve plots, especially the radial sand ridges covered by the reserves. The nominated properties adequately reflect and protect all kinds of natural, dynamic elements of the intertidal wetlands. The area presents a coherent landscape spectrum, from wetlands on the land side to radial sand ridges, showing comprehensively the evolution of landforms and habitats related to tidal processes.

Yancheng wetlands on the Yellow Sea coast feature unique, complete intertidal mudflats in fresh water, brackish water and salt water zones. The nominated property (Phase I) and buffer zone area of more than 260,000 hectares will ensure the continuity of ecological functions, and the ecological processes in the intertidal zone can happen without restriction. Sufficient area, high quality mudflats and undisturbed natural ecosystems provide good stopovers and ample space for migratory birds.

The delimitation of the nominated property and buffer zone follow Guide to the operation of the World Heritage Convention (2016), meets the requirement of integrity and conservation management.

(1) The property includes all elements necessary to express its Outstanding Universal Value.

The delimitation of the nominated property and buffer zone follow Guide to the operation of the World Heritage Convention (2016), the principles are:

Include all the key features and elements contributing to the outstanding

universal values of the nominated property;

Include continuous areas of sufficient size to ensure and represent the integrity of natural landscape, natural phenomenon, and biodiversity conservation;

Ensure the integrity of geography unit, following natural boundary as far as possible;

Avoid human activities posing negative impact on OUVs, e.g. harbors, industrial regions, artificial reservoirs, and aquacultural ponds;

Ensure the property to be covered by existing protected areas;

Cover the key habitat for threatened birds to the greatest extent, including foraging fields, stopovers and roosting sites;

The buffer zone stretches on the west of the nominated property, providing protection from the inland side, where there is potential threat from human activity.

The nominated properties are located in the coastal area of Yancheng Municipality, east Jiangsu Province, in the south of Yellow Sea Ecoregion. The areas are mostly covered by two National Nature Reserves: Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve. The boundaries are determined according to the integrity of heritage value and the natural geographical attributes.

The nominated properties include two component parts:

Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1):

The north boundary starts from Zhugangzha, extends towards east to the north boundary of Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve. The west boundary starts from Zhugangzha, extends towards south along the boundary of reclamation area to Chuandonggang,

turns west for 2.18 km, turns southwest to Dongchuan sea dyke, extends along the Chuanxin Road for 2.75 km, reaches the north boundary of reclamation area and turns to east to the Liangduohezha, turns south along the ridge of reclamation area, reaches to the north boundary of Tiaobei 2-12 and then turns east, along the Tiaozini dyke to the Tiaozini Scenic Area and turns west to the esat boundary of Tiaonan freshwater aquiculture, and turns south to the south boundary of Tiaozini reclamation area. The south boundary starts from the south boundary of Jiangsu Yancheng Tiaozini Wetland Park, extends towards east along the south boundary of Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and end at the 21 km east of Tiaozini Scenic Area. The east boundary coincides with the east boundary of Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Dongsha Experiment Zone.

Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2):

The North boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards east for 5 km. The west boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards southeast along the boundary of reclamation area to Xinyanggang estuary and reaches the north boundary of the core area of Yancheng Wetland Rare Birds National Nature Reserve. From the south bank of Xinyang Harbor, the west boundary extends 1943 m southwards, turns towards 405 m east of the sea dyke, extends southwards parallel to the sea dyke until the boundary of Dafeng County, extends 100 m southwards to the north bank of Doulong Harbor, then eastwards along the bank until the -3m isobath, and turns southward towards the parallel line 3 km south of the eastward extension of Simaoyou River. The south boundary is the parallel line 3 km south of the eastward extension of Simaoyou River, extending eastwards until 5km offshore. The east boundary is the -3m isobath, which marks the boundary of intertidal zone.

The buffer zones surround the nominated properties from the west, providing buffer and extra protection. The boundaries of the buffer zones are also determined considering the continuity of natural components, landscapes and human activities.

On the east of both components of the nominated property are subtidal mudflats, where there is no fixed artificial facility. The extremely complicated hydrological condition provides natural barriers for the nominated property, preventing large ships from approaching. So the buffer zones are established on the west (land side) of the nominated property.

(2) The property is of adequate size to ensure the complete representation of the features and processes which convey the property's significance.

The nominated property extends eastwards from the edge of the area of human activity (townships, farmlands, fish ponds), covering a series of undisturbed coastal habitat types, including subtropical-warm temperate transitional evergreen/deciduous mixed broad-leaved secondary forest, Imperata cylindrical grassland, reed marsh, Suaeda glauca marsh, Spartina alterniflora marsh, mudflats with no vegetation, tidal channels and shallow sea. The coherent landscape spectrum shows comprehensively the evolution of landforms and ecosystems related to landscape changes and hydrological processes.

From the sea side to the land side, the transition types are: mudflat with no vegetation, Spartina alterniflora marsh, Suaeda glauca marsh, Aeluropus sinensis grassland, Imperata cylindrical grassland or reed marsh. On the most salty mudflats with no vegetation live the most abundant benthic animals, which provide rich food resources for migrating birds.

Secondary forests, Imperata cylindrical grasslands and reed marshes are major habitats for Pere David's deer, water deer and reed parrotbill. Reed marshes and Suaeda glauca marshes are major habitats for red-crowned crane and geese and ducks. Mudflats with no vegetation are habitats for numerous waders and gulls. The ranges of red-crowned crane and Pere David's deer in this region are mostly within YS-1, YS-2 and their buffer zones.

The nominated properties and buffer zones add up to over 260,000 hectares, ensuring the continuity of ecological functions, so that the ecological processes in the intertidal zone can happen without restriction. Sufficient area, high quality mudflats and undisturbed natural ecosystems provide good stopovers and ample space for migratory birds.

At present, the nominated properties and buffer zones are located within Jiangsu Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve, Jiangsu Yancheng Tiaozini Wetland Park, Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Jiangsu Dongtai Tiaozini Wetland Nature Reserve Plots, all strictly protected by the laws of China. The official Ecological Red Lines also provide adequate protection. These management and protection policies can ensure that the region remains undisturbed, maintaining intact ecosystems and ecological processes.

The nominated properties include the core areas and intertidal wetlands in the two reserves, one wetland park, and two nature reserve plots, while the buffer zones and experimental zones of the two reserves, and Tiaozini reclamation area surround the west side (land side) of the nominated property, providing adequate buffer and protection from the inland direction. The nominated properties and buffer zones satisfy the species' current need of space.

3.1.d Requirements for protection and management

The nominated properties and buffer zones are all located within the Jiangsu Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve, Jiangsu Yancheng Tiaozini Wetland Park, Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Jiangsu Dongtai Tiaozini Wetland Nature Reserve Plots. The nominated properties are all state-owned, protected by laws and regulations such as the Constitution of the People's Republic of China, the Forest Law of the People's Republic of China, the Environmental Protection Law of the People's Republic of China, The law on the protection of wild animals of the People’s Republic of China, the Regulations of the People's Republic of China on Nature Reserves, Marine Environment Protection Law of the People's Republic of China, Regulations for the implementation of the protection of wild plants in People's Republic of China,Management approach of Jiangsu Yancheng National Nature Reserve, Regulations on the protection of wetlands in Jiangsu, Jiangsu provincial Forestry Bureau Office on the establishment of wetland nature reserve plots notice, and Measures for the administration of Jiangsu Wetland Park. The legal system guarantees the Institutionalized legal protection for the OUVs of nominated properties.

Jiangsu Yancheng National Nature Reserve was enlisted as a Human and Biosphere of the UNESCO member in 1992, as a member of Northeast Asia crane protection area network in 1996, as a Ramsar site in 2002 together with Dafeng National Nature Reserve. The provincial government pays great concern to the world heritage nomination and biodiversity conservation. In the 13th Five-year Plan of Jiangsu, the nomination of world heritage in the Yellow Sea coast and increase of biodiversity are highlighted.

On the other hand, management bureaus had been established in the

nominated property. Conservation measures and plans had been implemented. The cooperation mechanism among government, institutions, and communities has been established with sufficient staff and financial supports. There are 185 full-time staffs in the nominated property, a wetland park and two wetland nature reserve plots have also set up a special protection management team, who take in charge of safeguard, law enforcement, research, monitor, tourism and education. Many institutions, e.g. Nanjing University, Nanjing Forestry University, Fudan University, Beijing Forestry University, and Chinese Academy of Science, had launched various research programs on wetland ecosystem services, land form of tidal flats, carbon cycles, bird migration, and natural history of flagship species.

The management plans for the nominated properties had been accomplished.

In the future, we will continue to strengthen the protection and management of the nominated properties in the following aspects:

1) Strengthen the monitoring and research of the elements with OUVs, including landscapes and biological elements, in order to implement adaptive management. 2) Monitor and study the threats, and carry out targeted prevention, control or remediation measures; 3) involving enterprises and residents in the nominated properties and buffer zones in the management, monitoring and public education actions, and continue to promote public participation and concern in the protection work; 4) improve the interpretation system, control the number of tourists and enhance the ecological education for tourists; regulate access to tourist areas, strengthen supervision and keep the impact of tourism and transportation on the minimal level; 5) establish a unified administration office to lead the management of the nominated properties and buffer zones (Yancheng Municipal People's Government of Jiangsu Province has approved the establishment of World Heritage

Application and Management Office Yancheng Municipality); 6) enhance the protection and management of the nominated properties and buffer zones by integrating the administrative forces of the two nature reserves; 7) use the technical support from the expert group for Yancheng World Heritage nomination, local authorities, monitoring and research institutions, and universities, who will be responsible for the monitoring, protection and management of the nominated properties; 8) promote local legislation to protect the nominated properties and formulate the "Regulations for the Protection of Yancheng's World Heritage Nominated Property”.

3.2 Comparative Analysis

3.2.a Aspects for comparative analysis

The Yellow Sea and Bohai Gulf coast contain the world’s largest intertidal mudflat, a key node of the East Asian-Australasian Flyway. The East Asian-Australasian Flyway, among all the main flyways, is used by the largest number of migratory bird species, as well as the largest number of threatened species. Large rivers (Yellow River, Yangtze River, Yalu River, Liao River, Luan River, Hai River etc.) continuously discharge sediments into Yellow Sea and Bohai Gulf, accumulating to form a series of different habitat types such as mudflats, beaches, and marshes, providing habitats for various migratory birds. These globally important habitats maintain the amazing bird biodiversity on the East Asian-Australasian Flyway.

TheMigratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) meet the Criteria (ix) and (x) for selection of World Heritage sites. On the flyway used by the largest number of migratory bird species and the largest number of threatened species, a large number of endangered species are concentrated in certain seasons in the relatively

limited space of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China. Moreover, a large proportion of the populations of many endangered species aggregate in several certain sites, giving these sanctuaries globally outstanding value in terms of research and conservation. Considering Criterion (x), the nominated property will be compared with several existing World Heritage sites on the East Asia-Australasian Flyway, which also feature the outstanding universal value of migratory bird sanctuaries.

The landscapes and ecological processes along the Yellow Sea-Bohai Gulf coast are shaped by two interacting processes: accumulation of the sediment discharge from rivers in east China, and subsidence of the East Asian continental shelf. Large rivers such as the Yellow River, the Yangtze River and the Huai River, meandering over vast alluvial plain, bring fertile silt and muddy water into the shallow basin of the Yellow Sea. The natural process of sea level change and subsidence has formed more than 3 million hectares of the world's largest radial sand ridges. The radial sand ridges are worldwide unique coastal landscapes, consisting of estuary deltas formed in different eras since Pleistocene and shaped by the geological structure, estuary deposition and tidal hydrological conditions. This is the main element supporting Criterion (ix), in terms of which the nominated property can be compared with various types of coastal World Heritage sites. The nominated property is not only a key habitat for a large number of endangered species, but also represents the typical characteristics of coastal and marine ecosystems. Changes in its wetland landscape patterns also reflect the evolution of flora and fauna in coastal and marine ecosystems. Its ecosystem services also fully reflect the ecological and physiological processes in the development of communities within its ecosystem. They can be described as

outstanding, irreplaceable examples of coastal and marine ecosystems in the world. A detailed comparative analysis is as follows.

3.2.b Comparison with other coastal World Natural Heritage sites or nominated properties on the East Asian-Australasian Flyway (considering Criterion (x))

The East Asian-Australasian Flyway starts from Alaska and east Siberian tundra in the Arctic Circle, extending southwards to Ganges Delta, Southeast Asian islands, Australia and New Zealand. Within this vast range lie a series of migratory bird habitats of coastal wetlands, distributed in 13 World Heritage sites including Kluane / Wrangell-St. Elias / Glacier Bay / Tatshenshini-Alsek (Canada and the United States), Shiretoko (Japan), Ha Long Bay (Vietnam), Puerto-Princesa Subterranean River National Park (Philippines), Lorentz National Park (Indonesia), Ujung Kulon National Park (Indonesia), The Sundarbans (India, Bangladesh), Ningaloo Coast (Australia), Shark Bay, Western Australia, Wet Tropics of Queensland (Australia), Great Barrier Reef (Australia), Gondwana Rainforests of Australia and Te Wahipounamu – South West New Zealand. At present, the Yellow Sea ecoregion does not have any coastal World Natural Heritage; there are only two projects on the tentative list: “The Coast of the Bohai Gulf and the Yellow Sea of China” and “Southwestern Coast Tidal Flats” in Republic of Korea. We hereby compare the sites YS-1 and YS-2 in the project Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I), based on the preparatory list of "China's Bohai Bay-Yellow Sea Coastal Zone", with the World Heritage sites above, in terms of criteria for selection and outstanding universal value related to migratory bird habitats. In addition, we compared the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf

of China (Phase I) with the Southwestern Coast Tidal Flats in Republic of Korea.

Fig. 3-2 World Heritage sites or nominated properties on the East Asian-Australasian Flyway with outstanding universal value related to migratory bird abitat

Table 3-2 Comparison of the nominated property with other World Heritage sites on the East Asian-Australasian Flyway

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
Nominated property	(ix) (x)	YS-1 N 32°55′55″ E 121°1′0.53″ YS-2 N 33°33′17.85″ E 120°36′5.46″	144,839 ha 43,804 ha	-	Palaearctic realm2.15.6Oriental Deciduous Forest	Threatened birds, including Baer's pochard, spoon-billed sandpiper, Siberian crane, red-crowned crane, black-faced spoonbill etc.	Key stopovers, wintering grounds and breeding grounds for numerous cranes, geese and ducks and waders
Kluane / Wrangell-St. Elias / Glacier Bay / Tatshenshini-Alsek (Canada; United States)	(vii)(viii)(ix)(x)	N 61°11′51.3″ W 140°59′31.1″	9,839,121 ha	1979、1992、1994	Nearctic Realm 1.1.2 Sitkan	non-polar icefield, world's longest and most spectacular glaciers; Tatshenshini and Alsek river valleys are linkages from coast to interior for plant and animal migration.	Important breeding grounds for waders

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
Shiretoko (Japan)	(ix)(x)	N 43°56′57.984″ E 144°57′56.988″	71,100 ha	2005	Palaearctic realm2.14.5Manchu-Japanese Mixed Forest	Blackiston's fish owl and the *Viola kitamiana* plant	Stopovers for various migratory birds; important wintering ground for Steller's sea eagle
Puerto-Princesa Subterranean River National Park (Philippines)	(vii)(x)	N 10°10′0″ E 118°55′0″	22,202 ha	1999	Indomalayan 4.26.12 Philippines	limestone karst landscapes and subterranean river; 'mountain-to-sea' ecosystem and some of the most important forests in Asia	The coastal part is a stopover site for some waders.
Lorentz National Park (Indonesia)	(viii)(ix)(x)	S 4°45′0″ E 137°49′59.988″	2,350,000 ha	1999	Indomalayan 4.2.512Bornio	continuous, intact transect from snowcap to tropical marine environment, including	The coastal part is a stopover site for some waders.

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
						extensive lowland wetlands	
Ujung Kulon National Park (Indonesia)	(vii)(x)	S 6°45′0″ E 105°19′60″	78,525 ha	1991	Indomalayan 4.21.12Java	geological interest, particularly for the study of inland volcanoes; animals including Javan rhino, leopard, wild dog (dhole), leopard cat, fishing cat etc.	The coastal part is a stopover site for some waders.
The Sundarbans (India; Bangladesh)	(ix)(x)	N 21°56′42″ E 88°53′45″	133,010 ha	1987	Indomalayan 4.3.1Bengalian Rainforest	Continuous mangrove forest; endangered tigers, aquatic mammals, birds and reptiles	The coastal part is a stopover site for some waders.

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
Ningaloo Coast (Australia)	(vii)(x)	S 22°33′45″ E 113°48′37″	705,015 ha	2011	Australian realm 6.4.6 western sclerophyll	one of the longest near-shore reefs in the world; karst system and network of underground caves and water courses; sea turtles and other rare species; rich marine biodiversity	The coastal part is wintering ground for a large number of waders.
Shark Bay, Western Australia	(vii)(viii)(ix)(x)	S 25°29′10″ E 113°26′10″	2,200,902 ha	1991	Australian realm 6.4.6 western sclerophyll	The world's largest and richest seagrass beds; dugong population; stromatolites; five species of endangered mammals	The coastal part is wintering ground for a large number of waders.
Wet Tropics of Queensland (Australia)	(vii)(viii)(ix)(x)	S 15° 39′0″ E 144°58′0″	893,453 ha	1988	Australian realm 6.1.1 Queensland Coastal	Tropical rainforests, varied array of plants, as	The coastal part is wintering ground for a

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
						well as marsupials and singing bird	large number of waders.
Great Barrier Reef (Australia)	(vii)(viii)(ix)(x)	S 18°17′10″ E 147°41′60″	34,870,000 ha	1981	Australian realm 6.1.1 Queensland Coastal	world's largest collection of coral reefs, with 400 types of coral, 1,500 species of fish and 4,000 types of mollusc	The coastal part is wintering ground for a large number of waders.
Gondwana Rainforests of Australia	(viii)(ix)(x)	S 28°15′0″ E 150°3′0″	370,000 ha	1994	Australian realm 6.6.6 Eastern Sclerophyll	shield volcanic craters and the high number of rare and threatened rainforest species	The coastal part is wintering ground for a large number of waders.
Te Wahipounamu – South West New Zealand	(vii)(viii)(ix)(x)	S 45°2′9.7″ E 167°19′10.6″	2,600,000 ha	1990	Antarctic Realm 7.1.2 Neozealandia	fjords, rocky coasts, towering cliffs, lakes and waterfalls shaped by successive glaciation; endangered birds including takahë,	The coastal part is wintering ground for a large number of waders.

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
						kākāriki and the South Island subspecies of brown kiwi	

Table 3-3 Comparison of the nominated property with Southwestern Coast Tidal Flats, Republic of Korea

Content of comparison	Nominated property	Southwestern Coast Tidal Flats, Republic of Korea
Criteria	(ix) (x)	(viii)(ix)
Coordinates	YS-1:N 32°55′55″ E 121°1′0.53″ YS-2: 33°33′17.85″ E 120°36′5.46″	Gochang Tidal Flats N 35°27′35″ E 126°26′42″ Suncheon Tidal Flats N 34°52′55″ E 127°30′48″ Muan Tidal Flats N 34°58′15″ E 126°22′37″ Buan Tidal Flats N 35°43′35″ E 126°36′16″ Boseong Tidal Flats N 34°49′48″ E 127°22′41″
Area	YS-1: 144,839 ha YS-2:43,804 ha	-
Formation cause of wetlands	Mudflats, beaches and marshes are formed by the sedimentation of discharges from large rivers like Yangtze River and Yellow River under the unique hydrological conditions and historical changes in the Yellow Sea-Bohai Gulf area.	The open coastline is directly exposed to seasonal influences by monsoon: In winter, strong waves create sand flats; in summer, tidal effects are stronger than the waves, creating mudflats.
Habitat types	Mudflats, marshes, radial sand ridges	Sand flats, mudflats
Threatened species	20 threatened bird species including Baer's pochard, spoon-billed sandpiper, Siberian crane, Chinese crested-tern, Oriental stork, red-crowned crane, black-faced spoonbill, reed parrotbill etc.	The threatened species above except Oriental stork, Siberian crane and reed parrotbill
Number of bird species	415	~300

3.2.c Comparison with other coastal or delta-type World Natural Heritage sites or nominated properties (considering Criterion (ix))

In the world, apart from the properties mentioned in 3.2.b, there are another 23 World Natural Heritage sites and one nominated property with outstanding universal value related to coastal zones:

Europe, West Asia and North America (13 World Natural Heritage sites, one World Heritage nominated property): Wadden Sea (Denmark; German; Netherlands), High Coast/Kvarken Archipelago (Finland; Sweden), West Norwegian Fjords – Geirangerfjord and Nærøyfjord, Dorset and East Devon Coast (United Kingdom), Giant's Causeway and Causeway Coast (United Kingdom), Danube Delta (Romania), Ilulissat Icefjord (Denmark), Gros Morne National Park (Canada), Olympic National Park (United States), Redwood National and State Parks (United States), Islands and Protected Areas of the Gulf of California (Mexico), Whale Sanctuary of El Vizcaino (Mexico), Sian Ka'an (Mexico), and Kızılırmak Delta Wetland and Bird Sanctuary (Turkey, nominated property);

Central and South America (6): Darien National Park (Panama), Río Plátano Biosphere Reserve (Honduras), Belize Barrier Reef Reserve System, Area de Conservación Guanacaste (Costa Rica), Atlantic Forest South-East Reserves (Brazil) and Península Valdés (Argentina);

Africa (4): Sanganeb Marine National Park and Dungonab Bay – Mukkawar Island Marine National Park (Sudan), iSimangaliso Wetland Park (South Africa), Namib Sand Sea (Namibia) and Banc d'Arguin National Park (Mauritania).

Six of the ten coastal World Natural Heritage sites in Africa and Central and

South America (Darien National Park (Panama), Río Plátano Biosphere Reserve, Belize Barrier Reef Reserve System, Area de Conservación Guanacaste, Atlantic Forest South-East Reserves and Banc d'Arguin National Park) are tropical coastal ecosystems, including rocky shores, coral reefs, beaches and mangrove forests, without large areas of coastal plains or mudflats. On the other hand, Península Valdés is cold, barren coast, with the major objects for protection being marine mammals. Sanganeb Marine National Park and Dungonab Bay – Mukkawar Island Marine National Park, iSimangaliso Wetland Park and Namib Sand Sea show the transition of ecosystems from savanna or desert to ocean, represented by sandy coastal landscapes.

Six of the World Natural Heritages in Europe and North America (High Coast/Kvarken Archipelago, West Norwegian Fjords – Geirangerfjord and Nærøyfjord, Dorset and East Devon Coast, Giant's Causeway and Causeway Coast, Ilulissat Icefjord, and Gros Morne National Park) were nominated under criterion (viii), showing fossils, lava movements or Quaternary glacial relics left on the coast by tectonic activities.

Olympic National Park, and Redwood National and State Parks, both in United States, embody the basin ecosystems and landscapes composed of mountain forests, rivers and ocean, protecting unique and threatened species in this environment. In Mexico, Islands and Protected Areas of the Gulf of California and the Whale Sanctuary of El Vizcaino (Mexico) protect the steep shores, deep bays and threatened species inhabiting the Gulf of California, especially multiple species of large whales. Sian Ka'an features complex forms of limestone coasts, and vegetation types such as tropical forests and mangroves, and the biodiversity depending on them. The above Heritage sites are all rocky shores, rather than open, flat marine deposition plains and

beaches.

In summary, only two Heritage sites (Wadden Sea and Danube Delta) and one nominated property (Kızılırmak Delta) contain landscapes and habitats comparable to the nominated property on Yancheng Yellow Sea coast: marine deposition plains, vast tidal flats or deltas of large rivers. They are compared in the following table:

Table 3-4 Comparison of the nominated property with other coastal and delta-type World Heritage sites

Content of comparison	Nominated property	Wadden Sea	Danube Delta	Kızılırmak Delta
Criteria	(ix) (x)	(viii)(ix)(x)	(vii)(x)	(vii)(x)
Coordinates	YS-1:N 32°55′55″ E 121°1′0.53″ YS-2: 33°33′17.85″ E 120°36′5.46″	N53°31′43″ E8°33′22″	N45°4′59.99″ E29°30′0″	N41°40′ E36°05′
Area	YS-1:144,839 ha YS-2:43,804 ha	1145609ha	312,440 ha	56.000 ha.
Year of inscription	-	2009、2014	1991	-
Biogeographic realm	Palaearctic realm2.15.6Oriental Deciduous Forest	Palaearctic realm2.9.5 Atlantic	Palaearctic realm 2.29.11 Pontian steppe	Palaearctic realm 2.17.7Mediterranean Sclerophyll
Number of plant species	324	900	-	561
Number of bird species	415	106	300	352
Major object of protection	20 threatened bird species including Baer's pochard, spoon-billed sandpiper, Siberian crane, Chinese crested-tern,	largest unbroken system of intertidal sand and mud flats in the world	River basin and delta of Europe's second longest river	The most important wetland ecosystem in the south Black Sea basin.

Content of comparison	Nominated property	Wadden Sea	Danube Delta	Kızılırmak Delta
	Oriental stork, red-crowned crane, black-faced spoonbill, reed parrotbill etc.			
Formation cause of wetlands	Mudflats, beaches and marshes are formed by the sedimentation of discharges from large rivers like Yangtze River and Yellow River under the unique hydrological conditions and historical changes in the Yellow Sea-Bohai Gulf area.	The sand and mud flats are formed via the unique tidal effect; the effect of river discharge is weak.	Single modern river delta	Single modern river delta

3.2.d Comparison with inland, wetland-type World Natural Heritage sites or nominated properties on the East Asian-Australasian Flyway (integrating Criteria (ix) and (x))

In inland regions, there are also World Natural Heritage sites as important inland migratory bird sanctuaries on the East Asian-Australasian Flyway, such as Landscapes of Dauria (Mongolia; Russian Federation), Uvs Nuur Basin (Mongolia; Russian Federation) and Kaziranga National Park (India). They are compared with the nominated property in the following table:

Table 3-5 Comparison of the nominated property with inland, wetland-type World Natural Heritage sites on the East Asian-Australasian Flyway

Name of property	Nominate property	Landscapes of Dauria	Uvs Nuur Basin	Kaziranga National Park
Country	China	Mongolia; Russian Federation	Mongolia; Russian Federation	India
Criteria	(ix) (x)	(ix)(x)	(ix)(x)	(ix)(x)
Coordinates	YS-1:N 32°55′55″ E 121°1′0.53″ YS-2: 33°33′17.85″ E 120°36′5.46″	N 49°55′48.8″ E 115°25′31.6″	N 50°16′30″ E 92°4′11″	N 26°40′0″ E 93°25′0″
Area	YS-1:144,839 ha YS-2:43,804 ha	912,624 ha	898,063.5 ha	42,996 ha
Year of inscription	-	2017	2003	1985
Biogeographic realm	Palaearctic realm2.15.6Oriental Deciduous Forest	Palaearctic realm 2.30.11 Mongolia-Machurian Steppe	Palaearctic realm 2.30.11 Mongolia-Machurian Steppe	Indomalayan Realm4.9.4 Burma Monsoon Forest
Number of plant species	324	-	-	-
Number of bird species	415	-	359	-

Name of property	Nominate property	Landscapes of Dauria	Uvs Nuur Basin	Kaziranga National Park
Major object of protection	20 threatened bird species including Baer's pochard, spoon-billed sandpiper, Siberian crane, Chinese crested-tern, Oriental stork, red-crowned crane, black-faced spoonbill, reed parrotbill etc.	Dauria steppe ecosystem; threatened birds and migratory birds including white-naped crane, and great bustard mammals including Mongolian Marmots and Pallas Cats	Pleistocene ice sheets and numerous glacial lakes; important habitats for migratory birds, waterbirds and seabirds; rare animals in the deserts like gerbil, jerboas and the marbled polecat; globally endangered snow leopard, mountain sheep (argali) and the Asiatic ibex in the mountains	one of the last areas in eastern India undisturbed by a human presence; the world's largest population of one-horned rhinoceroses, as well as many mammals, including tigers, elephants, panthers and bears, and thousands of birds
Role on the EAAF	Important breeding grounds, wintering grounds and stopovers for cranes, geese and ducks, and waders	Important breeding grounds and stopovers for cranes, geese and ducks, and waders	Stopovers for waders, gulls, geese and ducks	Stopovers for various migratory birds

3.2.e Summary of uniqueness

In summary of the comparative analyses, the nominated properties Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) have the following globally unique value:

Firstly, the nominated properties are at the center of the East-Asian Australasian Flyway, providing major stopovers, breeding grounds or

wintering grounds for the largest number of threatened migratory bird species, especially endangered or critically endangered species. However, this region is still a gap in the World Heritage list, despite the existence of large areas of World Natural Heritage sites on the north, south and westernmost parts of the flyway (east South Asia, for example the Sundarbans in Bangladesh).

Secondly, compared with the other nominated property in the Yellow Sea ecoregion, the Southwestern Coast Tidal Flats in Korea, the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) have been formed in different historical periods by large river discharge, unique ocean hydrological conditions, and continuous tectonic subsidence of the East Asian continental shelf. The alluvial plains, delta plains, marine deposition plains, mudflats and radial sand ridges have been shaped by different geological and ecological processes, leading to difference in the ecosystems and the biodiversity they can maintain.

Thirdly, in terms of the landforms of marine deposition plains, delta plains or tidal flats, only a few heritage sites or nominated properties in the world are comparable to the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I), including the Wadden Sea, the Danube Delta, the Kızılırmak Delta and the Southwestern Coast Tidal Flats in Korea. However, they are quite different in terms of causes, scale and conservation value for endangered species.

In summary, the nominated properties in the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) have indispensable outstanding value for the conservation of endangered migratory birds. Their landscapes and ecosystems are also globally significant as examples of coastal landscapes and ecosystem evolution

3.3 Proposed Statement of Outstanding Universal Value

3.3.a Brief synthesis

The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a serial world natural heritage nominated property consisting of natural wetland habitats such as deltas, sandbanks, mudflats, saltwater/freshwater marshes, rocky shores, islands and ancient coastlines, as well as salt pans, fish ponds and rice paddies.

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China contains the world's largest continuous mudflat seashore. Sediments and nutrients are continuously discharged from the Yellow River and Yangtze River (they are among the world's longest ten rivers) and other rivers including Yalu River, Liao River, Luan River and Hai River, accumulating to form fertile mudflats, radial sand ridges and sandbanks. Thanks to the diversity of sediment properties, hydrological conditions and landforms, the migratory bird habitats along the coast also include massive sand dunes, lagoons, rocky shores, and islands where threatened birds aggregate to breed. Nowadays, the dynamic process of river sediment discharge and continental shelf subsidence continues to shape the geological landscape and ecosystem on the Bohai Gulf-Yellow Sea coast, making it one of the most diverse and fertile coasts in the world, providing key habitats for migratory birds on the East Asian-Australasian Flyway.

The serial nomination sites are key stopovers, wintering grounds or breeding grounds for some of the world's most noticed threatened bird species, including three critically endangered water birds: the Chinese crested-tern (*Thalasseus bernsteini*) with the global population just more than a hundred,

and the spoon-billed sandpiper (*Eurynorhynchus pygmeus*) and the Baer's pochard (*Aythya baeri*), with only hundreds of individuals left in the world. Almost all individuals of the Nordmann's greenshank (*Tringa guttifer*), the great knot (*Calidris tenuirostris*), and the Far Eastern curlew (*Numenius madagascariensis*) depend on these habitats.

The East Asian-Australasian Flyway Partnership assessed the importance of 1030 reserves and migratory bird habitats on the flyway. The results showed that the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast, and are thus suitable for the first phase of the nominated property. The serial nomination sites Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) involve two components: 1) Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1) and 2) Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2). The two nominated properties are separated by the Dafeng Port and the surrounding areas with dense human activity, with their boundaries about 30 kilometers apart.The East Asian-Australasian Flyway Partnership assessed the importance of 1030 reserves and migratory bird habitats on the flyway. The results showed that the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast, and are thus suitable for the first phase of the nominated property. The serial nomination sites Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) involve two areas: 1) Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1); and 2) The Middle Section of Jiangsu Yancheng National Nature (YS-2). The two nominated properties are separated by the Dafeng Port and the surrounding areas with dense human activity, with their boundaries about 30 kilometers apart.

1. **Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1).** The nominated property consist of two interconnecting parts in Dafeng District, Yancheng, Jiangsu: 1) The core area (on the east of Dongchuan sea dyke) of Jiangsu Dafeng National Nature Reserve located (referred to as “Dafeng”); 2) the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (referred to as “south section of Rare Bird Reserve” and “Dongsha”), , and the intertidal zone and sea in between. The area of the nominated property is 144,839ha, plus a buffer zone of 28,271 ha on the west. Jiangsu Dafeng National Nature Reserve contains typical habitat types of secondary forest on marine deposition plain and freshwater reed marsh. The south part of Rare Bird Reserve and Dongsha embody the complete ecosystems of intertidal mudflats, radial sand banks and sand ridges. Dafeng is home to the world’s largest captive population and largest reintroduced population of Père David's deer (or milu, *Elaphurus davidianus*). The south part of Rare Bird Reserve and Dongsha provide an important stopover site for the waders on the East Asian-Australasian Flyway. Half of the world’s spoon-billed sandpipers and Nordmann's greenshanks make long stopovers, feed, or even moult in the nominated property and surrounding areas.

2. **Migratory Bird Habitat in the North of Yancheng, Jiangsu (YS-2).** The nominated property is located in Sheyang County, Tinghu District, Dafeng District, Yancheng, Jiangsu, containing the core area in the middle section of Jiangsu Yancheng National Nature Reserve (referred to as “middle section of Rare Bird Reserve”). The area of the nominated property is 43,804 ha, plus a buffer zone of 51,785 ha on the west. The middle section of Rare Bird Reserve mainly consist of habitat types of freshwater reed marsh and intertidal mudflat. It provides the most important wintering ground for the migratory population of red-crowned crane (*Grus japonensis*), with about 50%

(in some years 80%) of individuals spending the winter here each year.

On the east of both components of the nominated property are subtidal mudflats, where there is no fixed artificial facility. The extremely complicated hydrological condition provides natural barriers for the nominated property, preventing large ships from approaching. So the buffer zones are established on the west (land side) of the nominated property.

The area involved in the two nominated properties above constitute the largest coastal wetland on the west bank of Pacific Ocean. Within the two nominated properties, large tracts of coastal habitats remain less disturbed by human activity, retaining the natural ecosystem structure and functions, becoming one of the natural coastlines rare in this country and the world. These habitats, together with other sites along the Chinese coast to be nominated in the future, form indispensable links in the conservation network for more than 20 threatened bird species on the East Asian-Australasian Flyway.

3.3.b Justification for criteria

(ix) be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;

Since the Pleistocene, great rivers such as the Yellow River and the Yangtze River have been endlessly flowing into the Yellow Sea and the Bohai Gulf, carrying massive material from the Qinghai-Tibet Plateau and the Central Asian desert. On the other hand, the continental shelf in Yellow Sea and Bohai Gulf have been in the process of continuous subsidence. Accumulation of river sediment discharge and tectonic subsidence, combined with marine

hydrological processes and climate change, have jointly shaped the natural landscape along the Yellow Sea and Bohai Gulf coast, forming the basis for the occurrence and evolution of ecosystems.

Coastal plain in the nominated properties have been developed by marine deposition. Large rivers discharge into the southern Yellow Sea a large amount of sediments, which are then suspended and transported by tides and waves to be deposited in the intertidal zone. Meanwhile, the coastal plain continuously silts up, advancing to the sea, forming unique intertidal mudflats. Due to the tidal asymmetry (fast flood tides and slow ebb tides), the sediments transported by tides can be accumulated in the intertidal zone. With the effect of radial currents, radial sand ridges and tidal creek system developed by the movement of mud and sand. With the intense effect of tides and waves, the sand ridges grow and decline, in a tendency of accumulation and increase, and move towards the coast. Therefore, the sand banks in the middle of the radial sand ridges or closed to the coast are silting up. These processes resulted in the largest radial sand ridge system in the world, with the size over 30,000 km2. The dynamic changes of these landscapes driven by changes of river and marine hydrology and climate have become the major driving forces of the evolution of ecosystems and even species.

The vegetation zones in the nominated area shows remarkable zonation characteristics of coastal wetland vegetation: with changes of soil salinity and seawater submergence, the vegetation structure in the nominated area shows obvious transition and clear succession. From the sea side to the land side, the transition types are: mudflat with no vegetation, *Spartina alterniflora* marsh, *Suaeda glauca* marsh, *Aeluropus sinensis* grassland, *Imperata cylindrical* grassland or reed marsh. The spatial distribution of habitat types and vegetation communities change with the dynamic changes of the muddy

shore, forming the basis for the maintenance of biodiversity.

These two nominated properties not only represent the typical characteristics of the coastal and marine ecosystems and their changes in landscape pattern, but also highlight the evolution of their plant communities against the background of the dynamic changes in coastal landscape. At the same time, their ecosystem supporting services also fully reflect the ecological and physiological processes in various organisms related to adaptation and evolution, making the area an outstanding example of coastal and marine ecosystems.

(x) contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or conservation.

The nominated properties are located in the south of Yellow Sea Ecoregion (#203 in the WWF Global 200 Ecoregions), containing the world's largest continuous mudflat seashore, already listed as important wetlands in the Ramsar Convention. As one of the best preserved intertidal mudflats, Jiangsu Yancheng National Nature Reserve has joined UNESCO's Man and Biosphere reserves network. The area features rich biodiversity, providing key stopovers, breeding grounds and wintering grounds for migrating waterbirds on the East Asian-Australasian Flyway. The *IUCN situation analysis on East and Southeast Asian intertidal habitats* reveals 16 key areas for water birds along the flyway, while 7 of them are located in the Yellow Sea-Bohai Gulf region, and the nominated properties constitute the largest and most important key area among them. According to the assessment by East Asian-Australasian Flyway Partnership on the importance of 1030 reserves and migratory bird habitats on the flyway, the coastal wetlands in Yancheng rank

top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast. The nominated properties provide important habitats for the critically endangered species Baer's pochard, Siberian white crane, and spoon-billed sandpiper, and one of the important breeding and wintering grounds for the vulnerable species Saunders's gull (*Larus saundersi*). They also provide the most important wintering ground for the migratory population of red-crowned crane (*Grus japonensis*), with about 50% (in some years 80%) of individuals spending the winter here each year. In addition, the nominated properties provide natural habitats for the Pere David's deer, a species once extinct in the wild, within its historical range. It is currently home to more than two-thirds of the global population of wild Père David's deer, providing a model for reintroduction and rewilding of large mammals after extinction in the wild.

3.3.c Statement of integrity

The Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China involve large tracts of mudflats, beaches and other habitats connected to them through the migration of birds, consisting the largest coastal migratory bird habitat system, serving as key stopovers for bird migration between the two hemispheres and an important part of the East Asian-Australasian Flyway. The vast space provide high quality rest stops for more than a hundred species and millions individuals of migratory waterbirds, to replenish the fat they need for the continued flight.

The first phase of the serial nomination include all the intertidal wetlands undisturbed by human activity, including two existing nature reserves, especially the radial sand ridges covered by the reserves. The nominated properties adequately reflect and protect all kinds of natural, dynamic

elements of the intertidal wetlands. The area presents a coherent landscape spectrum, from wetlands on the land side to radial sand ridges, showing comprehensively the evolution of landforms and habitats related to tidal processes.

Yancheng wetlands on the Yellow Sea coast feature unique, complete intertidal mudflats in fresh water, brackish water and salt water zones. The nominated property (Phase I) and buffer zone area of more than 220,000 hectares will ensure the continuity of ecological functions, and the ecological processes in the intertidal zone can happen without restriction. Sufficient area, high quality mudflats and undisturbed natural ecosystems provide good stopovers and ample space for migratory birds.

Among them, Migratory Bird Habitat in the South of Yancheng, Jiangsu (YS-1) contains sandbanks, sand ridges, tidal channels and sea areas located in radial sand ridges, providing an important feeding ground for waders during low tides. The area also contains a series of habitat types from coastal mudflats to inland wetlands, providing resting areas for waders during high tides. The inland section includes the main range of Père David's deers and their all suitable types of habitats.

The Middle Section of Jiangsu Yancheng National Nature (YS-2) is the area with the highest concentration of red-crowned cranes, as well as a habitat favoured by other cranes, geese and ducks. The current nominated area contains all high quality habitats and all types of feeding and resting habitats for red-crowned cranes.

At present, the nominated properties and buffer zones are mainly located within Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve, both strictly protected by the laws of China. The official Ecological Red Lines also provide adequate protection. These management

and protection policies can ensure that the region remains undisturbed, maintaining intact ecosystems and ecological processes.

The nominated properties include the core areas and intertidal wetlands in the two reserves, as well as the Dongsha district, while the buffer zones and experimental zones of the two reserves surround the west side (land side) of the nominated area, providing adequate buffer and protection from the inland direction. At the same time, the ongoing sustainable management of farmland, fish ponds and salt works in the buffer zone also provided a space for the diffusion and movement of threatened species such as the red-crowned crane and the Père David's deer.

3.3.d Requirements for protection and management

The nominated properties are all state-owned, with the status of national nature reserves. A multi-level management system has been established from the state to the local areas, forming a mechanism for collaborative protection between government agencies and communities, social organizations and research institutes, with staff and funding guaranteed. Under the strict protection by the laws and regulations of the country and the local government, the natural status of coastal intertidal wetlands has been effectively maintained through the cooperation between government agencies, communities and social organizations, ensuring the survival and reproduction of the species, providing stopovers for migratory birds. At both national and provincial levels, the government has paid great attention to the protection and management of World Natural Heritage sites. The Outline for the 13th Five-Year Plan of Jiangsu Province clearly states, "We will support the Dafeng and Yancheng National Nature Reserves to be nominated for the World Natural Heritage List, and ensure that the ecological diversity of the key regional watershed improves

steadily."

In the future, we will continue to strengthen the protection and management of the nominated properties in the following aspects:

1) Strengthen the monitoring and research of the elements with natural heritage values, including landscapes and biological elements, in order to implement adaptive management. 2) Monitor and study the threats, and carry out targeted prevention, control or remediation measures; 3) involving enterprises and residents in the nominated properties and buffer zones in the management, monitoring and public education actions, and continue to promote public participation and concern in the protection work; 4) improve the interpretation system, control the number of tourists and enhance the ecological education for tourists; regulate access to tourist areas, strengthen supervision and keep the impact of tourism and transportation on the minimal level; 5) establish a unified administration office to lead the management of the nominated properties and buffer zones (Yancheng Municipal People's Government of Jiangsu Province has approved the establishment of World Heritage Application and Management Office Yancheng Municipality); 6) enhance the protection and management of the nominated properties and buffer zones by integrating the administrative forces of the two nature reserves; 7) use the technical support from the expert group for Yancheng World Heritage nomination, local authorities, monitoring and research institutions, and universities, who will be responsible for the monitoring, protection and management of the nominated properties; 8) promote local legislation to protect the nominated properties and formulate the "Regulations for the Protection of Yancheng's World Heritage Nominated Property”.

4. State of Conservation and factors affecting the Property

4.a Present state of conservation

4.a-1 Natural conditions

The two components of the nominated properties, YS-1 and YS-2, are less than 30km apart, with similar conditions of geology, topography, climate, hydrology and soils. So these aspects will be introduced as a whole in the following paragraphs.

The genus of the nominated properties belongs to the warm temperate deciduous broad-leaved forest and the subtropical evergreen broad-leaved forest in the Chinese vegetation zone, which are mainly divided into two sub-regions: namely the warm temperate southern sub-zone, the subtropical evergreen and broad-leaved mixed forest zone. China-Japan forest plant sub-region belongs to the Pan-Arctic plant area in the geographical area of the plant.

The nominated properties provide wildlife with unique habitat and living environment, unique vegetation types and rich biological species with a more complete ecosystem. According to the Global Habitat Classification System in IUCN/SSC, five of the first-level habitats are nominated for inscription on heritage. The vegetation types distributed in the nominated properties are mainly coastal seawater vegetation, saline marsh vegetation, brackish water vegetation, saline soil aquatic vegetation, coastal sandy vegetation, and these types of vegetation form the basis of ecosystem. The salinity of salted soil from the east to the west decreases from the seashore to the inland, and the distribution of saline soil communities, from the sea to the land in the direction

of the transition are as follows: un-vegetated bare beach, *Spartina* marsh, *suaeda* marsh, *Aeluropus littoralis* marsh, *Imperata* or *reed* marsh, and according to its salt tolerance, from strong to weak, these species distributions form a specific ecological sequence.

The geographical distribution of plant flora in the nominated properties is mainly the world-wide distribution genus, followed by the distribution of tropics and the distribution of the northern temperate zone. There are obvious characteristics of the transition from pan-tropical zone to temperate zone in the distribution area of the families and genus. The genus 217 belongs to 13 distribution areas. Among them, 47 are pantropical genus, 43 are distributed in the world, 43 are the north temperate zone genera, 25 in the old world temperate, 13 disjuncted types of species in the East Asia and North America, 12 in the East Asian distribution, 7 in Mediterranean, west to central Asia, 6 in the tropical Asia, 5 in the temperate Asia, 4 in the old world tropical, 3 in tropical Asia to tropical Australasia Oceania, 3 in tropical Asia to tropical Africa, and 2 in tropical & subtropical East. Asia & (S.) tropical America disjuncted.

Yancheng Yellow Sea Wetlands are located in the eastern deciduous forest biological geography province of the Palearctic realm of the world biogeography. In the Chinese animal geography, Yancheng Yellow Sea Wetlands belong to Huazhong district of China's seven major animal geographies.

There are 680 species of vertebrates, including 6 orders 12 families and 26 species of mammals, of which is 1 species of protected animals at the national level I, 1 species of national protected level II. Reptiles have 3 orders 6 families and 14 species. Amphibians include 1 order, 4 families and 9 species, of which have the national II protection animals 1 species. Fishes

have 29 orders 83 families and 216 species. Birds include 19 order 53 families and 415 species. According to the IUCN list of endangered species, there are 3 critically endangered species (CR), 8 of endangered species (EN), 12 of vulnerable species (VU), and a total of 23 species. There are many species of birds that are protected and are threatened, which indicate that the surrounding environment and the significance of birds are special and important in the nominated properties.

In the areas of environmental monitoring, the relevant basic data on the nominated properties are described in more detail in the text 2.a "Heritage description" and 6.c "Past monitoring results", as described in Annex 4 "List of properties". In general, the nominated properties highlight the outstanding universal values, so that ecosystems, endangered species and habitats, aesthetic landscapes, species trends, and natural environment of the nominated properties is well maintained.

4.a-2Threats to the outstanding universal values and protection measures

4.a-2-1Coastal ecosystems and flora and fauna community evolution and development process

(1) Threats and challenges

Reclamation: Due to the high salinity, the new reclamation flats cannot be directly planted. In the early stage, the breeding industry was developed, which resulted in the transformation of a wetland ecosystem composed of a variety of habitat types into a single fish pond and shrimp pond. There is a great deal of damage to the habitat of the shorebirds, especially waders.

(2) Protection and management policies and measures

The ecological red line has been designated to prohibit reclamation beach wetlands, and the mechanism of ecological compensation has started to establish ecological zones.

4.a-2-2 Biodiversity value

(1)Threats and challenges

Invasive alien species. In 1983, *Spartina alterniflora Loisel*, which is used as a beach guard and forage crop in China, had grown in some of the flats in the protected areas, showing an increasing trend in area. The areas of important bird habitats such as red-crowned cranes and black-headed gulls have decreasing trends that have threatened the local biodiversity resources.

(2) Protection and management policies and measures

The policies and measures includes the develoment of international cooperation, the introduction of foreign technology and inter-sprinkle grass governance.

4.a-2-3 The threaten factors regulation and the protection measures

In terms of laws, the nominated properties belong to the national and provincial protected areas and is protected by national laws and regulations. Yellow Sea Wetlands of Yancheng was protected by laws and regulations such as the Constitution of the People's Republic of China, the Forest Law of the People's Republic of China, the Environmental Protection Law of the People's Republic of China, Marine Environment Protection Law of the People's Republic of China and the Regulations of the People's Republic of China on Nature Reserves.

The nominated properties have established a sound management system and management organizations, with adequate staff and financial guarantee. The nominated properties have established four management levels: national,

provincial, prefecture and heritage nomination. To exercise the government's management authority and functions of the natural heritage resources, the Nature Reserve Authority Offices of the nominated properties have been built up and effectively implements a unified management for protection of nominated properties and human, material and financial resources management.

The nominated properties have prepared a conservation management plan, delineated clear field boundaries and established a corresponding monitoring system. The nominated properties have prepared the protection documents of "Master Plan of Yancheng National Nature Reserve (2008-2020)", "Yancheng Wetland National Reserve Five Years Construction Management Plan in Jiangsu (2012-2017)" and "Master Plan of Jiangsu Dafeng National Nature Reserve (2013-2022)", designated delineation of the scope of protection and made clear, standard pile circles. In order to further strengthen the strict protection and rational utilization of nominated properties, the nominated properties have also determined the overall goal of protecting nominated properties management, and the divisions of reasonable protection zones. For implementation of classification based on the importance of the protection of heritage value, the nominated properties have put forward the protection and management measures in detail, and established a monitoring system for the corresponding, heritage’s biodiversity and habitat, ecosystem and community ecology process, environmental quality, natural disasters and tourists. Also the nominated properties have made long-term dynamic monitoring, and the establishment of the heritage monitoring archives.

Jiangsu Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve, Jiangsu Yancheng Tiaozini Wetland Park, Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Jiangsu Dongtai Tiaozini Wetland Nature

Reserve Plots are the body of the world nominated properties management authority at local sites. National Forestry and Grassland Administration and Jiangsu Forestry Bureau have implemented guidance to the protected areas administration institutes. At the same time, Ting Lake District, Dafeng District, Sheyang County and Dongtai City in Yancheng City have implemented territorial protection administration of the protected areas. In recent years, the protected areas and all levels of government and relevant departments have followed the "protection first, use late; planning first, and then development" principle, adhered to the unity of ecological, economic and social benefits, and the road of sustainable development. By strengthening the legal system construction and scientific management, people's legal concepts have been increased and improved in law enforcement efforts. At the same time, the two protected areas resolutely cracked down on the destruction of the ecological environment and the protection of biological diversity, and gradually formed a favorable atmosphere conducive to biodiversity conservation. Therefore, the red-crowned crane, other rare species and protected areas of biodiversity have been effectively protected and a successful example of the world's ecologists as birds of the "Kingdom", a model of ecological protection and biodiversity conservation have been provided in China's protected areas.

Since the establishment of the five protected area management organizations, it has gradually established a complete set of measures to combat illegal hunting and protect the patrol system. In addition, the management organizations actively promote the protection of the public through the protection of birds stop, rescue the injured wild animals, joint protection between the police and public, community protection publicity, volunteer participation and other protection activities to enhance the level of protection and the public awareness of protection, so that the natural heritage of the nominated properties have become a model of domestic nature conservation.

4.a-3 Monitoring indicators and statistical standards

According to the characteristics of the nominated properties, selecting appropriate monitoring indicators can improve the monitoring index system where includes seven categories of sub-ecological, environmental conditions, geological topography, seismic activity, tourism activities, illegal activities, community status monitoring.

1. Biological ecology monitoring: Adopted fixed sample (with) the monitoring and tracking method, the distribution and number of special vegetation community, and the population dynamics, habitat conditions, scale, the source epidemic situation of red-crowned cranes, crane, Oriental white stork, black stork, black-faced spoonbill, Spoon-billed Sandpiper, Pere David's Deer and other protected species on a regular basis;

2. Environmental monitoring: Adopted automatic equipment positioning monitoring methods, the meteorological conditions, surface water quality and quantity of water, groundwater quality water level, coastal erosion, soil physical and chemical properties are made for a long-term monitoring plan in the nominated properties;

3. Geological and geomorphological monitoring: Adopted automatic equipment positioning monitoring methods, periodic monitoring the key geological features of the stratified standard, base rock standard, GPS standard stone, ground fissure monitoring status are made for a long-term monitoring plan in the nominated properties;

4. Seismic activity monitoring: Adopted automatic equipment location monitoring methods, real-time monitoring of precursory activities, shocks and post-earthquake activities are made for key seismic activity areas;

5. Tourism activities monitoring: on the data of visitor centers, regularly

monitoring the number of visitors and tourists, road traffic conditions, the safety status of visitors, the quality of tourism facilities are made for a long-term monitoring plan in the nominated properties;

6. Illegal activities monitoring: Adopted patrols and remote sensing technology, regularly monitoring the number of indiscriminate hunting and hunting, illegal fishing are made for a long-term monitoring plan in nominated properties;

7. Community status monitoring: Adopted manual research methods, regularly monitoring residents of the settlement of the production and living conditions, construction, population changes and income levels and other indicators are made for a long-term monitoring plan in the nominated properties.

4.b Factors affecting the properties

4.b-1 Development pressure

The pressure of development within the scope of the nominated properties mainly is from industry and aquaculture.

At present, there are a number of coastal port and industrial parks, such as Sheyang Harbor and Industrial Park, Dafeng Port and Marine Economic Development Zone, which have a large number of small industrial parks and industrial parks. Concentrated and production areas and living facilities are close to the nominated properties, and coastal areas have been launched industrial projects, such as wind power, chemical enterprises, sewage seaside for the local coastal ecological environment has a serious impact. In particular, in terms of the intertidal zone along the Yancheng coast is basically flat muddy coast, the sea and ocean sea water exchange capacity is weak, and the pollutant diffusion dilution ability is poor. These have posed a great threats to ecosystem and ecological security of the nominated properties.

With the increased of fish ponds, shrimp ponds and other aquaculture area, aquaculture pollution has become a category of pollution sources cannot be ignored. According to the relevant statistics, about 30% of the fishing baits put into the pond was not eaten by fish, shrimp and crabs, which sink with the feces and other excreta of the fish and shrimp, causing the pollution of the pond. At the same time, in order to increase the number of plankton in the water, the activities of chemical fertilizers, soy milk into the pool have been applied in the ponds; in order to eliminate the dying creatures, the general application of lime, potassium permanganate, copper sulfate and other chemical substances are used for disinfection and pool cleaning. These baits, remnants, fertilizers and waste excrement, often discharged into the sea through drainage.

4.b-2 Environmental pressures

The environmental pressure of the nominated properties include land subsidence and sea level rise.

The coastline in Yancheng is long, inter-tidal zone is rich in wetland resources and the average elevation of coastal plains is about 3 m. In space, the site of the land area includes the waste Yellow River Delta plain and the central coastal sea plain, it is located in the latitude and the sea low-lying terrain condition, therefore disaster effect of making the sea level rise is particularly evident. Sea level rise will gradually drown low-lying land, flood the beach resources, increase the intensity of seawater intrusion and exacerbate coastal erosion.

4.b-3 Natural disasters and risk preparedness

Extreme weather events such as typhoons and jungle cyclones, cold waves, heavy rain, hail and tornadoes, storm surges, floods and droughts, resulting in

losses and more and more impact, the annual loss of natural disasters caused by more than 95% are derived from the weather and its derived disaster. The frequent occurrence of extreme weather events has directly caused great harm to the infrastructure, production and living in nominated properties, the buffer zones and their surrounding communities.

Migratory birds are closely related to climate. Such as the end of February to early March, the average daily temperature higher than 3 ℃, the maximum temperature rose to 10 ℃, and the red-crowned crane began to migrate north; In case of the impact of warm south, the red-crowned crane accelerated from south to north to fly. When the cold wave occurs, for the red-crowned crane movement rhythm have a greater impact.

4.b-4 Responsible visitation at World Heritage sites

(1) The status of tourism development

In 2009, the State Council executive meeting adopted the "Jiangsu coastal area development plan", and pointed out that China's eastern coastal areas of economic development is an important growth in Jiangsu coastal areas of construction and development. In 2011, Jiangsu Province issued "the views on further development and acceleration of tourism"; in 2012, Jiangsu Province invested 490 million yuan for Yancheng wetland protection and repair. Coastal wetland tourism has become the focus of the development of tourism projects in Jiangsu Province.

YS-1and YS-2: the current tourism and tourism activities are mainly in both Jiangsu Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve and Tiaozini scenic area as the focus of the coastal beach natural scenery. In 2005, Yancheng successfully created a national excellent tourist city, while the establishment of the red-crowned crane and Pere David’s Deer

wetland tourism economic zone. In 2015, Jiangsu Dafeng National Nature Reserve won the "National AAAAA level tourist attractions". Tiaozini scenic area has formed a unique view of mudflat. The tide rises in a vast ocean, and the tide falls in a flat stream, and back and forth. People can take off their shoes, walk down the dam to the beach, also step in the mud to pick up shells, crabs, that people can close contact with the sea.

Three tourist modes by transport reach to Yancheng are cars, trains and aircraft, respectively. Traffic conditions in the continuous improvement of the situation, the accessibility of the area is also increasing. Yancheng District has now opened direct the red-crowned crane wetland ecological park by bus travel lines. In 2016, domestic tourists are concentrated in Jiangsu, Zhejiang, Shanghai, Shandong and Anhui Provinces and their cities.

YS-1The main scenic spots in the nominated properties include the Pere David’s Deer Park, and Tiaozini Scenic Spot. YS-2 Yancheng Red-crowned Crane Wetland Ecotourism Zonem.

Pere David ’s deer Park, Yancheng red-crowned crane wetland eco-tourism zone has two scenic spots of full-time tour guides (a total of 32 people). Explaining the content mainly includes wild animal and plant habits, wildlife protection, biodiversity, protection of the story, protection and management status. At the same time, the descriptions with a number of promotional films and illustrations show the beauty of wetlands, animal spirit and magnificent beaches. Tiaozini Scenic spot currently is open, and no fixed guide and display area.

The three scenic spots are equipped with status display and educational facilities, including exhibition centers, signs, publications, etc. The guides can explain and promote the natural value of Yancheng Yellow Sea wetlands and wild animals and plants habits at any time for visitors.

Table 4-1 Construction area within the buffer zone of the nominated properties

Scenic name	number of employed persons	number of tour guides)	Number of facilities in the scenic area)													
			number of published	(Number of signs)	Exhibition Center)	Visitor centre) (㎡)	Accommodations			Shop		parking lot		Washing rooms		
							construction area (㎡)	Number of rooms	Number of bed	Number	area (㎡)	Number	Area (㎡)	Number(seat)	Area (㎡)	Toilet seat number
China Pere David's Deer Park	120	24	28	276	2100	3000	35400	72	100	55	26310.4	2	19784	8	961	222
Tiaozini scenic area	15	4	4	26	4000	/	26000	92*	83*	2	40	2	9000	1	50	16
Yancheng Red-crowned Crane Wetland Ecotourism Zone	36	8	22	500 (ADB)	9600	1380	1558	25	48	2	105	1	15000	7	424	62

* the number in surrounding area.

(2) The number of tourists forecast

At present, there are the three scenic spots within the nominated properties for the tourists to stay, shopping, parking and other facilities. In the sites, a display center, signs and full-time tour guides have been set up to provide visitors with a convenient service. In the scenic spots a total of 97 rooms, 148 beds and 3 parking lots can be provided accommodation for tourists, parking and other services.

The status of tourists who have been nominated to the nominated properties are to reach Yancheng city by car, train and airplane, and then the tourists can reach the scenic area by cars or tour line, to watch the natural beauty and stop at the concentrated area of wild animals.It is foreseeable that future nominations will attract more visitors if the nominated property enters the World Heritage List.

(3) The number of tourist control and management measures

The key places of the nominated properties, the conduct of tourism will be prohibited at any time. The level of restriction is graded according to the extent to which visitors may have an impact on the protected species, the importance of the conservation species and restriction level and degree are in Table 4-2.

Table 4-2 Restrictions on Tourism Personnel

Restriction level	Restrictio n degree	Visitors travel diameter per capita	Notes
1	strictest	A	For the ring line, do not interfere with the red-crowned crane and other wild animals as a condition
2	More strict	B	
3	not very strict	C	For the connection path between the loop and the habitat, the vegetation or water carrying capacity is used as a condition

Restriction level	Restriction degree	Visitors travel diameter per capita	Notes
4	less strict	D	Restrictions on footpaths between seawalls and popular tourist areas

Note: The distance, A <B <C <D, for different protected species, A and B length is different; for different bearing capacity of vegetation and different self-purification capacity of water, C length is different.

According to different periods and different uses, different levels of restrictions will be taken for water channels, "visitors per capita length of travel" for "the average length of the length of the cruise ship."

The same path varies at different time limits.

At the same time, for different protection objects, subordinate to different levels of restriction, the path strictly will be enforced at the level of restrictions.

In tourist areas， visitors have to choose green ways such as bicycles, camp vans, tour buses, walking etc., which should be smaller than ordinary vessels, can take less space. When choosing electric vehicles and other modes of transportation, the whistle is prohibited from disturbing wild animals. On loop roads only walking can be allowed to choose.

Tourist areas can be done based on the towns of Huangjian, Sanlong, Yuhua, Tongshang, Caomiao, Daqiao etc.. The appropriate towns will be selected as a basis for the construction of green hotels, green restaurants, green shopping centers and tourism distribution center. These towns are the western edge of the nominated properties. If a reasonable planning is made, "three wastes" are properly handled and the wild animals and plants to be protected are not used for consumption, there are almost no adverse effects on the protected area. In some of the protective areas, small and simple accommodation facilities may be constructed, which are not for the purpose of enjoying life but for tourists to observe wildlife and attend other special activities. Tourist areas require visitors to bring their own food or not eat, so the protection areas do not build hotels and shopping. The consumption activities of wild animals and plants to be protected are prohibits in shopping centers and the ordinary wild animal and plant resources shall be used

rationally.

Table 4-3 Travel time and the level of restriction

Place	time	Protected object status	Restriction degree
Yancheng Red-crowned Crane Wetland Ecotourism Zone	28th October——28th February of the following year	Red-crowned cranes in the winter, from the saltworks of Sheyang mainly far viewing the second group of red-crowned crane, nominated properties and the third group of red-crowned crane on the reed base of Sheyang	The four-level restrictions are implemented on seawall; under the seawall, a first-level restriction is implemented for the loop line and the watch towers set on the edge of Yancheng National Nature Reserve; the three-level restrictions is implemented for the connection; If the link is located in Xinyang harbor, the forbidden line; if located in the loop, the first-level limit is implemented, and if it is outside the loop, perform a three- level limit.
	20/3——30/5	During black mouth gull breeding period and migratory migratory period, mainly distant view suaeda beach in the nominated properties, black-headed gulls of Sheyang salt field seawall and the reservoir; far view of the saltwork, salina and pumping beach of Sheyang, migratory birds in middle channel harbor of the nominated properties.	
	1/8——30/10	During the migratory migratory period, mainly watch the salina and pumping beach of Sheyang, migratory birds in middle channel harbor of the nominated properties	
	Other time periods	no special protection object	The four-level restrictions are implemented on seawall; under the seawall, loop and connecting roads are the implementation of three-level restrictions
Pere David's	Mid November ——	the main watch of the fifth group of red-crowned crane in the	The four-level restrictions are implemented on seawall; under the

Place	time	Protected object status	Restriction degree
Deer Park	28th February of the following year	reclamation area of Zhu Chuan, the VI small group of red-crowned crane in the reclamation area of Dongchuan during red-crowned crane over the winter	seawall, loop and connecting roads are the implementation of three-level restrictions
	20/3——30/5	mainly watching black mouth gulls of Chengmen, Zhu Chuan harbor and migratory birds of Zhugang in Dongchuan during blackhead gull breeding period and migratory migratory period	The four-level restrictions are implemented on seawall; under the seawall, the loop is the implementation of a second-level restrictions, the three-level restrictions are implemented for the connection paths
	1/8——30/10	The main view of migratory birds on the beach of Zhugang during migratory birds migratory period	
	June - August, around May	Pere David's deer estrus, farrowing period	The four-level restrictions are implemented on seawall; under the seawall, the loop is the implementation of a first-level restrictions, the three-level restrictions are implemented for the connection paths
	Other time periods	Pere David's deer	The four-level restrictions are implemented on seawall; under the seawall, loop and connecting roads are the implementation of three-level restrictions
Tiaozini scenic area	20/3——30/5 1/8——30/10	During the migratory migratory period, mainly watch the migratory birds in Tiaozini mudflat of the nominated properties	The four-level restrictions are implemented on seawall; under the seawall, the loop is the implementation of a first-level restrictions

The tourist area is strictly restricted according to the time and place, a sign is set at the beginning of each section of the tour path, and some people are assigned to manage it. The publicity and education on the behavior restrictions of tourists should be given before the visitors can travel to the tourist areas through the travel agency. Also a guidance manual should be provided to visitors, which includes the following contents: non-smoking, do not make noise, do not litter, do not pick off flowers, do not go beyond the scope of activities, do not buy animal and plant products, pursue conservation principles as far as possible and adhere to the principle of saving. Especially when visitors take a ring tour of the first-level or second-level limit, they try to become a natural listener, listening walk, while walking look for wild animals (mainly birds) figure. Please do not shout, do not touch, do not move forward and maintain a certain distance between people and wild animals when visitors catch sight of wild animals. Please use natural light and cannot use the flash to prevent wild animals from being shocked when visitors take a picture of wild animals (especially birds). In order to reduce the natural "exposure" in nature and the visual pollution to the birds, visitors should try to choose "vegetation color" clothing. For artificial domesticated animals, visitors should not be fed casually, so as not to damage the ecological balance. Visitors strictly follow the guidebook issued by the tourist area, limit their own behavior, and turn yourself into an active eco-tourist.

4.b-5 Number of inhabitants within the property and the buffer zone

There are no villages and villagers within the scope of the nominated properties, and there are three companies in the buffer zones, namely, Ocean Affairs Bureau of Sheyang County, Jintan Haitou Development Co. Ltd.of Huangjian Town in Tinghu District, Fangqiang Farm, which is a total of 3517 residents.

Table 4-4 Estimated populations located within nominated properties and the buffer zones

Nominated Property	Population (person)
YS-1	the nominated property: 0 the buffer zone: 2154 Total: 2154 Year: 2018
YS-2	the nominated property: 0 the buffer zone: 5381 Total: 5381 Year: 2018

5. Protection and Management of the Property

5.a Ownership

The nominated property is owned by the People's Republic of China. The administrative rights of the natural resources, public facilities and infrastructure of the nominated properties are all state-owned. The land area covered by Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve, Jiangsu Yancheng Tiaozini Wetland Park, Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots and Jiangsu Dongtai Tiaozini Wetland Nature Reserve Plots are owned by the protection zone, and the residents have the right of residence.

5.b Protective designation

5.b-1 Protected areas

Table 5-1 Protected areas in the nominated property

Nominated properties		Protected area (time of establishment)
Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)	YS-1	Jiangsu Yancheng National Nature Reserve (October,1992) Jiangsu Dafeng National Nature Reserve (December, 1997) Jiangsu Dongtai Gaoni Wetland Nature Reserve Plots (October, 2016) Jiangsu Dongtai Tiaozini Wetland Nature Reserve Plots (October, 2018) Jiangsu Yancheng Tiaozini Wetland Park (Jaunuray, 2019)
	YS-2	Jiangsu Dafeng National Nature Reserve (December, 1997)

5.b-2 Legal basis for protection and management

5.b-2-1The main legal and regulatory provisions for the protection of the nominated properties

Table 5-2 Laws and regulations for the protection of the nominated properties

Name	Time of promulgation (Year)	Issuing authority
Constitution of the People's Republic of China and the amendment of the Constitution	1982	National People's Congress of the People's Republic of China
Criminal Law of the People's Republic of China and amendment of the criminal law	1979	Standing Committee of the National People's Congress of the People's Republic of China
Wild Animal Protection Law of the People's Republic of China	2016	Standing Committee of the National People's Congress of the People's Republic of China
Environment Protection Law of the People's Republic of China	2014	Standing Committee of the National People's Congress of the People's Republic of China
Water Law of the People's Republic of China	2002	Standing Committee of the National People's Congress of the People's Republic of China
Marine environmental Protection Law of the People's Republic of China	2017	Standing Committee of the National People's Congress of the People's Republic of China
Regulations of the People's Republic of China for the Implementation of the Protection	2011	State Council of the People's Republic of China

Name	Time of promulgation (Year)	Issuing authority
of Terrestrial Wildlife		
Regulations of the People's Republic of China on the Protection of Wild Plants	1996	State Council of the People's Republic of China
Regulations of the People's Republic of China on Natural Reserves	2011	State Council of the People's Republic of China
Regulations of Jiangsu Province on the administration of coastal zones	1991, 1997	Standing Committee of Jiangsu Provincial People’s Congress
Regulations of the Jiangsu on Environmental Protection	1993, 1997	Standing Committee of Jiangsu Provincial People’s Congress
Regulations of the Jiangsu on the Protection of Marine Environment	2007, 2016	Standing Committee of Jiangsu Provincial People’s Congress
Flood Control Regulations of Jiangsu Province	2010, 2017	Standing Committee of Jiangsu Provincial People’s Congress
Regulations of Jiangsu Province on the Protection of Wild Animals	2012, 2017	Standing Committee of Jiangsu Provincial People’s Congress
Measures for the administration of Jiangsu wetland park	2012	Jiangsu Forestry Bureau
Regulations of Jiangsu Province on Tourism	2015	Standing Committee of Jiangsu Provincial People’s Congress
Measures for the Declaration and Protection of the World Natural Heritage and Natural and Cultural Dual Heritage (for Trial Implementation)	2015	Ministry of Housing and Urban - Rural Development of the People's Republic of China

Name	Time of promulgation (Year)	Issuing authority
Regulations of Jiangsu Province on Wetland Protection	2016	Standing Committee of Jiangsu Provincial People’s Congress

5.b-2-2 Summary of relevant laws and regulations

1) "Constitution of the People's Republic of China"

Article 9 The State guarantees the rational use of natural resources and protects precious animals and plants. Prohibit any organization or individual from using any means to encroach or destroy natural resources.

Article 22 The State shall protect historical sites, precious cultural relics and other important historical and cultural heritages.

Article 26 The State shall protect and improve the living environment and ecological environment, and prevent pollution and other public hazards.

2) "Water Law of the People's Republic of China"

Article 5 The State shall protect water resources and take effective measures to protect vegetation, plant trees and grasses, protect water resource, prevent soil erosion and water pollution, and improve the ecological environment.

3) "Law of the People's Republic of China on the Protection of Wild Animals"

Article 6 Governments at all levels shall strengthen the management of wildlife resources and formulate plans and measures for the protection, development and rational utilization use of wildlife resources.

Article 8 The State protects wild animals and their living environment and prohibits any units or individuals from illegally hunting or destroying them.

Article 9 The State shall give priority to the protection of precious and endangered wild animals. Nationally protected wild animals are divided into level I and level II protected wild animals. The establishment and adjustment of national protection wild animals shall be made by the administrative department of wild animals under the State Council and submitted to the State Council for approval.

4) "Environmental Protection Law of the People's Republic of China"

Article 17 The people's governments at all levels shall, for all kinds of representative natural ecosystem areas, the natural distribution areas of rare and endangered wild animals and plants, the important water conservation areas, the geological structures with significant scientific and cultural value, famous karst cave and fossil distribution areas, glaciers, volcanoes, hot springs and other natural relics, as well as cultural relics, ancient and famous trees, should take measures to protect and forbidden damage.

Article 19 The development and utilization of natural resources shall be rationally developed and protected, and the ecological security shall be safeguarded, and the ecological protection and restoration and management plan shall be formulated and implemented in accordance with the law.

Article 23 Urban and rural construction should combine the characteristics of the local natural environment, protect vegetation, water and natural landscape, and strengthen the construction and management of urban gardens and scenic spots.

5) " Nature Reserve Regulations of the People's Republic of China "

Article 4 The State shall adopt economic and technological policies and measures to make for the development of nature reserves, and incorporate

the development plans of nature reserves into the national economic and social development plans.

Article 18 Nature reserves can be divided into core areas, buffer zones and experimental areas. The natural ecosystems in the nature reserves and the centralized distribution of rare and endangered plants and animals shall be classified as core areas and shall prohibit any organizations and individuals from entering. Except for the provisions of Article 117 of this Regulation, and the core zone is not allowed to engage in scientific research activities. The buffer zone can be settled outside the core zone, only allowed to engage in scientific research observation activities. The experimental zone can be settled outside the buffer zone, which allowed to carry out the scientific experiments, teaching practice, tourism and domestication, breeding rare, endangered wild animals and plants and other activities. The people's government that originally approved the establishment of a nature reserve may, if necessary, delimit a certain area of the external protection zone in the periphery of the nature reserve.

6) “Regulations of the People's Republic of China on Protection of Wild Plants”

Article 9 The State protects wild plants and their habitats. Any unit and individual illegal collection of wild plants or the damage of habitats are prohibited.

Article 11 In the habitats of national and local protected wild plants and animals, the nature reserve shall be established in accordance with the relevant laws and administrative regulations.

Article 14 The administrative department of wild plants and the relevant units

shall be responsible for the conservation of the environment and shall, if necessary, establish breeding bases and germplasm resources library or take ex situ conservation measures for protection of the national and local wild plants.

7) “Regulations of the People's Republic of China on the Implementation of Terrestrial Wildlife Conservation”

Article 8 Any units and individuals are prohibited from undermining the national and local protected wildlife breeding and living habitats.

8) “Regulations on Wetland Protection in Jiangsu Province”

Article 29 Except as otherwise provided by laws and regulations, it is forbidden to engage in the following acts in important wetlands:

(1) reclamation, landfill wetlands;

(2) digging sand, soil, mining, establishing pond, burning;

(3) the introduction of alien species or released animals;

(4) destruction of wildlife habitats and fish migration routes;

(5) hunting wild animals, picking up birds or collecting wild plants, catching fish or other aquatic organisms in a extinction mode;

(6) accessing or cutting off wetland water;

(7) dumping or stacking solid wastes, discharging untreated sewage and other toxic and hazardous substances;

(8) other acts that destroy the wetlands and their ecological functions.

9）Measures for the Administration of Jiangsu Wetland Park

Article 18 Illegal reclamation of wetlands, mining, sand mining and soil extraction, as well as illegal construction of real estate, resorts, golf courses and other construction projects and development activities that do not conform to the development of wetland park are prohibited in wetland park. The people's government shall ensure the ecological water security of the wetland park, and shall not construct projects and facilities that pollute the environment and destroy the ecology upstream or nearby.

5.c Means of implementing protective measures.

5.c-1 Management system

The two national nature reserves, one wetland park and two nature reserve plots have been managing the nominated property. Upon nomination, Yancheng Municipal People's Government of Jiangsu Province has approved the establishment of World Heritage Application and Management Office Yancheng Municipality as a unified administration office to lead the management of the nominated properties and buffer zones.

5.c-1-1 National level

National Forestry and Grassland Administration of the People's Republic of China and the National Committee of UNESCO of China are responsible for guiding the application for nomination, protection and management for the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I).

5.c-1-2 Level of Jiangsu Province

Jiangsu Forestry Bureau has established a leading group office to guide the work of wetland resources protection, as well as nomination of World Natural

and Cultural Heritage.

5.c-1-3 Local level

For the nomination, a work leading group and a leading group office have been set up in Yancheng Municipal People's Government. Also, a unit responsible for nomination has been established in Administration Bureau of two National Nature Reserve, one wetland park, and two nature reserve plots according to the requirement of Yancheng Municipal People's Government. In case of inscription, the nomination unit will be turned into heritage management organizations. In accordance with the principle of territorial management, the heritage management organizations are responsible for the protection and management of nominated properties and buffer zones.

Administrations of Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve are responsible for the management of the nominated properties. The application office in Yancheng has integrated the two reserve administrations of the protected area to establish a unified management organization, further strengthening the protection and management of the nominated properties.

Fig. 5-1 Management of the nominated property

5.c-1-4 Mechanism of management and coordination

The World Heritage Application and Management Office in Yancheng Municipality is responsible for the coordination of the two nature reserves, Tiaozini wetland management office and the local government, to ensure their communication and the implementation of management plan.

5.c-2 Content of protection

The nominated properties have made a plan with specific requirements for the protection and management of the sites from different aspects, aiming to protect the elements of Outstanding Universal Value of the nominated property:

(1) Conservation of biodiversity and habitats: The value of biodiversity is mainly embodied by the unique animals, plants and the ecosystem, including spoon-billed sandpiper, red-crowned crane, hooded crane, Siberian crane, Oriental white stork, whooper swan, black-faced spoonbill and other national I-class or II-class protected birds and threatened species, as well as Pere David’s deer, river deer and other protected mammals. Endangered plant and animal species and their habitats are the major focus of protection.

(2) Conservation of the ecosystem evolution process: the nominated sites not only represent the typical characteristics of the coastal and marine ecosystems and their changes in landscape pattern, but also highlight the evolution of their plant communities against the background of the dynamic changes in coastal landscape. At the same time, their ecosystem supporting services also fully reflect the ecological and physiological processes in various organisms related to adaptation and evolution, making the area an

outstanding example of coastal and marine ecosystems.

(3) Water body protection: The water bodies including natural rivers and coastal wetlands in the nominated properties will also become an object of protection.

(4) Pollution control: the atmosphere and water quality should be strictly controlled in the nominated property and the buffer zones to prevent pollution.

5.c-3 Zoning

5.c-3-1 Zoning for the nominated properties

The main objects of protection are the key or representative species, ecosystems and biological processes, namely, the areas of Outstanding Universal Value and animal and plant habitats. The distribution area is the core area of Yancheng National Nature Reserve and the core area of the northeastern direction of Jiangsu Dafeng National Nature Reserve, which covers an area of 188,643 ha, accounting for 100% of the nominated properties.

The natural ecosystems and landscape of the nominated properties must maintain the status quo. Tourism or any construction facility will be prohibited, and only configure the necessary researches, monitoring and safety protection facilities. The interference of the indigenous residents to the ecological environment must be limited and ecological restoration must be emphasized in the nominated properties.

Fig. 5-2 Zoning for the nominated properties

5.c-3-2 Buffer zones

The buffer zones are under the protection of Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve and the reclamation area of Tiaozini. These areas are managed according to the regulations of National Nature Reserves, protecting species like red-crowned crane, hooded crane, Siberian crane, Oriental white stork, whooper swan, black-faced spoonbill and Pere David's deer. The objectives of buffer zone management are to reduce the pressure posed by socioeconomic development on the elements of Outstanding Universal Value in the buffer zones, and to explore a sustainable way of utilizing the natural resources.

The management office of the nominated properties is responsible for the coordination with the relevant local government on the ecological protection of the buffer zones, in accordance with the law and coordinating the interests of stakeholders. The management measures of the buffer zones are as follows:

(1) All construction projects in the buffer zone require permission by the governments according to the management principles. All construction plans in the buffer zone must comply with the requirements of the protection and management planning for the nomination of the estate.

(2) Relevant departments within the estate management system shall fully coordinate and strictly control the construction scale and function of each facility, and shall not build up aquaculture industry or industry which is polluted and has an impact on the ecological environment of nomination;

(3) The government should guide the adjustment of industrial structure and reasonably develop the tourism industry. Under the premise that all land use patterns are consistent with the protection requirements of the nominated

land, the government can build a tourism service base to help increase the income of community residents in the buffer zone.

(4) Governments at all levels should implement the ecological compensation policy in the buffer zone in accordance with the ecological protection of wetlands and the policy of returning farmland to wetland.

(5) The heritage management agencies should, in conjunction with local governments and local communities, promote the fine culture of the community, encourage community members to participate in nature protection and strengthen the environmental protection and management of the buffer zone. At the same time, it should give full play to the role of residents in the buffer zone's indigenous communities and organize the participation of local residents in the protection of coastal wetlands and wildlife.

(6) Establishing the "1 + X" negotiation mode, that is, taking the management agency of the nomination as the lead unit, consulting and discussing the demands put forward by the relevant stakeholders in accordance with the requirements of protection and management planning, and the problems that are difficult to be coordinated are unified by the local government Coordinated solution. Jiangsu Provincial World Natural Heritage Management Commission conducted an occasional inspection of the implementation of the buffer coordination mechanism to promote its continuous improvement and effectiveness.

(7) Financial administrations at all levels give priority to the construction of public service facilities in the buffer community.

5.c-4 Monitoring

Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve are monitored by the corresponding protection stations. There are two ways of monitoring: self-monitoring and delegate commission monitoring. The management organizations of the nominated properties will be in charge of the monitoring of ecological conditions, environmental conditions, tourism activities, illegal activities, and community status. As the management office lack professional personnel or monitoring equipment, monitoring contents such as geology, earthquakes and groundwater will be commissioned on a regular or irregular implementation of monitoring by the relevant professional departments, research institutions or universities such as Fudan University, Nanjing University, Nanjing Normal University, Nanjing Forestry University, Yancheng Institute of Technology, Beijing Forestry University, National Birds Central Anniversary Center, British Bird Alliance, Royal Bird Protection Association (RSBP), wader experts from New Zealand and bird ringing experts from Scotland, based on the establishment of monitoring and research base.

5.c-4-1 Means of monitoring

The nominated properties are monitored by means of fixed-point observation, instrument monitoring, patrol monitoring of community and statistic surveys. Four levels of management Region - Branch - Station – Point have been established in Yancheng National Nature Reserve to monitor the status of the protection area. 12 of stations has been built in the Yancheng, including Chuandong Station (YS-1), Jianggang Station (YS-1), Xinyanggang Station (YS-2), Dongshagang Station (YS-2), Xiaoxinhe Station (YS-2), Lijiadun

Station (YS-2), Xiaba Station (YS-2), Sanlizha Station (YS-2). The 6 stations in YS-2 have a total of 19 people, 3 boats, 5 SUV, 5 unmanned aerial vehicles, 15 telescopes, 4 handheld GPS, 4 sets of law enforcement recorder, 12 motorcycles, 10 interphones and other equipments. Jiangsu Dafeng National Nature Reserve has established the two protection stations, namely the second stocking area and the third stocking area, with 4 staff, as well as 4 telescopes, 4 handheld GPS, 4 interphones, 4 battery cars and 1 patrol car.

5.c-4-2 Data processing

The scientific research departments of the Administrations of Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve and the management office of Wetland Park and Nature Reserve Plots are responsible for the collection and analysis of data. In case of emergency, the management office timely report to the high-level for decision-making, and effectively deal with the emergencies. The management organizations will regularly deliver the data of monitoring to relevant institutions for analysis and archiving, and also will regularly monitor the data commissioned by universities or research institutions for analysis and research, and strive to solve tough problems in time.

5.c-5 Local protection tradition

In the eyes of the people of Yancheng in Jiangsu, the crane is different from the other birds, and she always accompanies the good expectations. It is a famous "cultural bird", a symbol of "longevity", "luck", "good health" and "loyalty" in people's minds. In the reserve, Public Security Frontier Corps of Jiangsu Province sets up a road port border police station in the wetland border, and a "team of crane guards". They patrol the border of the reserve

day and night, and guard wild animals and plants.

5.c-6 Civic participation and community involvement

The nominated properties are closely linked to the local community. Through a lot of hard work of the staff in Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve, the community residents support the protection work with voluntary activities. Red-crowned cranes found to be sick in winter would immediately be reported or sent to the protection area for treatment. Any person found to kill wild animals would immediately be reported to the local public security, forestry and protection area management. The past "hunters" have become into today's "informants" in the community, and these will win the initiative for the full range of protection.

In order to promote science communication and scientific research, the two nature reserves have established long-term friendly relationships with the local schools, institutions and media.

5.d Existing plans related to municipality and region in which the proposed property is located

5.d-1 The existing relevant planning of Province in the nominated properties

5.d-1-1 The related planning of the Province in the nominated properties

The 13th Five-Year Plan of Economic and Social Development in Jiangsu Province (Government of Jiangsu Province, 2016);

The 13th Five-Year Plan of Economic and Social Development in Yancheng Municipality (Government of Yancheng Municipality, 2016).

5.d-1-2 Conservation plans that currently cover the nominated property

Biodiversity Conservation Strategy and Action Plan of Jiangsu Province (2013-2030) (Environmental Protection Office of Jiangsu Province, 2013);

Integrated Water Resources Planning of Jiangsu Province (People's Government of Jiangsu Province, 2011);

The Ecological Red Line Protection Plan of Jiangsu Province (People's Government of Jiangsu Province, 2013)

Ecological Protection and Construction Planning of Jiangsu Province (2014-2020) (Forestry Bureau of Jiangsu Province, 2015)

Marine Ecological Red Line Protection Plan of Jiangsu Province (2016 - 2020) (Ocean and Fishery Bureau of Jiangsu Province, 2017)

Overall Plan of Yancheng National Nature Reserve (2008-2020) (Environmental Protection Office of Jiangsu Province, 2009)

Overall Plan of Jiangsu Dafeng National Nature Reserve (2013-2022) (Forestry Bureau of Jiangsu Province, 2013)

5.d-2 Summary of relevant provisions of the plan

(1) Overall Plan of Yancheng National Nature Reserve (2008-2020) (Environmental Protection Office of Jiangsu Province, 2009)

The plan was formulated in 2009 and approved by Environmental Protection Office of Jiangsu Province. There are fourteen chapters in the plan.

Chapter 1 summarizes the origin of the plan, the basis for the preparation, the guiding ideology and planning principles, as well as the planning scope and time limit.

Chapter 2 describes the basic situation of the protection area. Yancheng National Nature Reserve belongs to wildlife category in the wild animal type. Protection area is on the south side of the estuary of Guan river in north of Chenjiagang Town of Xiangshui County, north of Xiangshui Chenjiagang town of Guan River Estuary, on the north side of the estuary of Sancang river in south of Dongtai City. The western boundary of the area is mostly the old seawall in 50s, where is the part of the appropriate section to move to the west between Xiangshui County and Sheyang County, on the east side of the sea minus 3 m isothermal line for the boundary.

Chapter 3 elaborates the historical evolution and the significance of the protection area, the main object of the protection area and its orientation and evaluation, the evaluation of the functional zoning and the management of the protection area, and the protection status quo.

Chapter 4 sets out the overall objectives of the plan.

Chapter 5 describes resource conservation and management planning.

Chapter 6 deals with research and monitoring programs.

Chapter 7 deals with publicity and education.

Chapter 8 clarifies the rational exploitation and utilization of resources.

Chapter 9 sets out the comprehensive environmental improvement plan.

Chapter 10 clarifies the key construction project planning.

Chapter 11 sets out the administrative planning.

Chapters 12 through 14 illustrate the assessment of investment and the implementation of planned safeguards and benefit analysis.

(2) Overall Plan of Jiangsu Dafeng National Nature Reserve (2013-2022) (Forestry Bureau Jiangsu Province, 2013)

Chapter 1 elaborates the background of the project, the basis of preparation, guiding ideology and principles, planning period and so on.

Chapter 2 describes the basic situation of the protected area and the status quo evaluation.

The protected area is situated in the southeast, where borders on gate of Tan Tu and Tun Men in Dongtai City. It is next to the Xin Cao farm in Jiangsu Province. It is connected to the forest farm of Dafeng and the Dongchuan farm in Shanghai on the west, and the north (northeast) is the vast ocean.

Chapter 3 sets out the overall layout of protected areas where includes the nature of protected areas and protection targets, planning objectives, functional zoning and layout of protected areas, and overall layout.

Chapter 4 sets out the planning.

Chapter 5 deals with key construction projects

Chapters 6 through 8 describe investment estimates and fundraising, safeguards and benefit evaluations.

5.e Property management plan or other management system

5.e-1 Existing conservation and management plans of the nominated properties

A management plan of the nominated property. A copy of the plan is attached in Annex 3.

Table 5-3 Existing planning for Nominated properties

Management plan	Compiled by	Time of approval
Management Plan of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)	Peking University	2019.1

5.e-2 Analysis and explanation

Based on principles of sustainable development, the Management Plan of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) was prepared by Peking University. It consists of 15 chapters:

Chapter 1 elaborates the background, main idea, planning type, application scope, basis of compilation, planning period and planning scope.

Chapter 2 shows the general situation of the nominated property, including geographic location, heritage type, natural history, human history, protection and management history of heritage.

Chapter 3 highlights assessment of current status of heritage, including the current state of management as well as stresses and threats.

Chapter 3 describes composition of heritage, includes ecosystem, avian habitat and flyway, Habitats of Pere David’s Deer and other mammals, intertidal zone of the Yellow Sea and radial sand ridges.

Chapter 4 lists the general rules of planning, including the basis, goals and principles of planning.

Chapter 5 emphasizes the conservation of elements with Outstanding Universal Value, including coastal wetlands, radial sand ridges and

biodiversity.

Chapter 5 describes the planning of management divisions.

Chapter 7 describes the management of potential disaster risk.

Chapter 8 describes the plan for demonstration and education, including visitors management.

Chapter 9 illustrates the effective evaluation methods.

Chapter 10 elaborates scientific research plan.

Chapter 11 emphasizes community participation, including community profile and plan for sustainable development of the local community.

Chapter 12 describes in detail the current and planned management system.

Chapter 13 illustrates the action plan, including a general time table and estimation for investment.

Chapter 14 demonstrates the legal and financial guarantees for the management of the nominated property.

Chapter 15 lists the supplementary provisions.

5.e-3 Guarantees for effective implementation

5.e-3-1 Legal guarantee

The laws and regulations of the People's Republic of China and the local laws and regulations of Jiangsu Province meet the management needs of the nominated properties (see 5b-2 in detail), so that the protection and management of the nominated properties can be protected according to law. At the same time, the nominated properties are working on the development

of new special regulations to provide protection for the nominated properties.

5.e-3-2 Management support

The nominated properties have a high-quality management team in which is from National Forestry and Grassland Administration, the People's Republic of China and other national level management organizations to the Jiangsu Forestry Bureau and other provincial-level specialized management organizations. The nominated properties have also set up a corresponding management organizations. Each division is responsible for the work of division, cooperating and co-managing, and strong organizational support will be provided to implement protected management plans for the nominated properties.

5.e-3-3 Community participation

The local community plays an important role in the management of the nominated properties and buffer zones. The life of local residents relies on the environment, inseparably related to the effect of protection of the nominated property. The effort of implementing conservation plans has been continuously improving the participation capacity and ecological awareness of the local community. In terms of resource management, the participation in conservation and management by the local community has turned from passive to positive, further facilitating the implementation of conservation and management plans.

5.f Sources and levels of finance

For a long time, national and local governments, and the management office attach great importance to the investment on the protection of the nominated properties. The investment by these authorities is increasing year by year, meeting the protection and management needs of the nominated property. Capacity building programs sponsored by the State and Asian Bank

contribute to the funding every year, according to the actual usage of the conservation projects.

Table 5-4 Source of funds of (Unit: RMB Yuan)

Year	Provincial funding		Total
	Jiangsu Yancheng NNR	Jiangsu Dafeng NNR	
2012	5415900	703300	6119200
2013	5776100	893300	6669400
2014	6167800	2022400	8190200
2015	6428500	2085300	8513800
2016	6845400	2294000	9139400

5.g Sources of expertise and training in conservation and management techniques

The nominated properties have invited domestic and foreign experts and scholars to study the geological topography, biodiversity and other elements of scientific interest, and to guide the protection and management. At the same time, the nominated properties also gain support and guidance from the National Forestry and Grassland Administration, the People's Republic of China, Ministry of Land and Resources of China, the State Environmental Protection Department of China, Fudan University, Nanjing University, Beijing Forestry University and other departments and research institutions. Regular or irregular trainings for the staff of nominated properties are supported by Jiangsu Provincial Department of Land and Resources, Environmental Protection Department, Forestry Bureau, Tourism Bureau and other

departments. The training covers relevant laws and regulations, resource protection, heritage planning and management, bird identification and rescue, community development and so on. The staff have acquired a deep understanding of the value and protection methods of the nominated properties.

5.h Visitor facilities and infrastructure

At present, there are three scenic spots in the nominated properties and the buffer zones, namely, China Pere David's Deer Park, Yancheng Red-crowned Crane Wetland Eco-tourism Area and Tiaozini Scenic Area, all located in the experimental zones of Jiangsu Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve and Tiaozini Wetland Park. Visitors mostly arrive by plane, train or car (driving or tour bus).

At present, China Pere David's Deer Park can receive visitors with 72 rooms, 100 beds and 2 parking lots; Yancheng Red-crowned Crane Wetland Eco-tourism Area has 25 rooms, 48 Bed and 1 parking lot. These two scenic spots also provide visitors with souvenirs, as well as audio and video products. Tiaozini Scenic Area is currently an open area, with 2 stores, 2 parking lots, 1 bathroom.

Table 5-5 Visitor facilities near the nominated property in Yancheng

Tourist service facilities		Number
Explain / explain	Tour route	/
	guide	47 persons
	Sign	802
	Publication	54 kinds of books

Exhibition Center	3 places，15700m^2
Visitor center	2 places，4380m^2
Accommodation	97 rooms，148 beds
Shop	59
Parking lot	5
Bathroom	16

5.i Policies and programmes related to the presentation and promotion of the property

At present, Jiangsu provincial govement has brought the nominated properties into Jiangsu society and economic development planning, they also establish the basic principles such as “scientific planning, unified management, stricted conservation, sustainable using”. They also have some policy on the heritage expenditure and protection.

5.i-1 Scientific Research

In recent years, Nanjing university, Nanjing normal university, Nanjing forestry university, Fudan university, the northeast institute of geography and agricultural ecology of the Chinese academy of sciences, the Ministry of environmental protection, Nanjing institute of environmental science and other institutions, as well as the Jiangsu provincial forestry bureau and other departments have been conducted great number of research programs and achievement in wetland ecosystem services, wetland landscape research, landscape changes, soil organic carbon accumulation, bird distribution and migration law, red-crowned crane overwintering, Pere David’s Deer habitat and so on. It laid a solid foundation for the ecological protection of the

nominated properties, the laws of species migration and the formulation of protection policies. Table-5-7 is a short list of these programs.

5.i-1-1 Scientific research achievements

Table 5-6 Results of Previous Research Projects

Features of Project			The Main Focus of the Research	Person in Charge
Features of Project	**Project Number**	**Level of Project**		
The Impact Assessment of Ecological Service Function of Wetland due to Reclamation and Sustainable Utilization of Resources	2013CB430405	National	Based on the eco-integrity of the wetland ecosystem in the Dajiang River Delta, the evaluation index system and method of wetland ecological service function were developed. The response and change trend of wetland ecological service function were evaluated and forecasted for different wetland ecological types based on the changes of ecological service function of different types of wetland ecosystems, the characteristics of change and uncertainties of various influencing factors. The conversion and mutation of ecological service functions and failure threshold were simulated and identified and sustainable use of the wetland resources was put forward to provide theoretical guidance and technical support for the wetland ecological restoration and safety control.。	An Shuqing

Research and Prediction of Sedimentation and Coastline Variations in Jiangsu Coastal Lines	BK2011012	Provincial	Through the collection of relevant data such as historical data, maps, remote sensing images and observation of the key sections of the shore area, this paper studies the historical evolution of the coastlines of Jiangsu, analyzes the causes and mechanisms of the erosion of the coastal tidal flats, and predicts future trend of the coastal evolution in Jiangsu. On this basis, the data of Jiangsu coastline shoreline were collected and the data base was established. At the same time, the index system and the evaluation model of the beach sediment have been established. In addition, an auxiliary decision-making system was set up for monitoring and predicting the changes of the beach sediment and coastal lines of Jiangsu Province, which has provided technical support and auxiliary decision making for the management of resources development and protection.	Gao Shu
A Study on the General Trend and Driving Mechanism of the Accumulation of Organic Carbon in Salty Bog Soil of Spartina Alterniflora	41273082	General of National Natural Science Fund	(1) A study on the reproductive mode of spartina alterniflora, including its basic characteristics of growth and investigation of community succession, and investigation of the seed germination, asexual ramets and seedling growth, growth and reproduction of Spartina alterniflora. (2) A study on the dynamic change of scope and driving factors of soil organic carbon pool of Spartina alterniflora, including dynamic change of time distribution of the organic carbon pool, the dynamic change space distribution of the organic carbon pool, the time and spatial dynamic distribution of the soil organic carbon sub-pool, and the feedback mechanism among the environmental factors.	Liu Jin’e

Study on the Response Mechanism of Temporal and Spatial Evolution of Wintering Crane to Human Activities and Spartina alterniflora	31570459	National Program	Red-crowned cranes are global endangered species and are of great value in biodiversity conservation. Yancheng coastal wetland is the largest wintering land of red-crowned cranes, which is affected by the invasion of human activities and Spartina alterniflora. The habitat area is shrinking, the landscape structure and process are changing continuously, the population number is decreasing and the wintering of cranes is facing a huge threat. Based on cutting edge researches and multi-disciplines, this paper makes use of information about the high-resolution remote sensing, GIS, computer technology and model simulation methods to conduct a research on the habitat quality of the red-crowned cranes from the perspective of multi-scale structure-process-function coupling effect, which was supported by field survey data for three consecutive years. The features of Multi-choices for the wintering of red-crowned cranes have been recognized. A spatial and temporal evolution model of the habitat quality of red-crowned cranes based on the process was established. The temporal and spatial evolution of the habitat quality of the red-crowned cranes and their response to human activities and Spartina alterniflora were revealed. And the long-term habitat quality evolution of red-crowned cranes and its effect on the number of wintering populations was clarified through long-term sequence simulation. The results of the study helps to deepen the understanding of the temporal and spatial dynamics of the wintering habitat of the red-crowned cranes from th。	Liu Hongyu

Dynamic Simulation of Coastal Wetland Landscape Evolution Based on Ecological Process - A Case Study of Yancheng Coastal Wetland in Jiangsu Province	41071119	National	This study intended to meet the strategic needs of national and regional development through reviewing current international researches. Under the background of uplifting Jiangsu's coastal development to the national strategic development based on the special geographical location and natural geography of Yancheng coastal wetland, it is necessary to correctly grasp the relationship between the landscape pattern and ecological process of the coastal wetland under the influence of nature and human beings. The study was started from monitoring the process system of wetland hydrology, soil and biology and other ecological processes to reveal the wetland biological and non-biological elements of the spatial and temporal evolution process and the regular patterns. It also endeavored to clarify the dynamic evolution relationship between the ecological process of the wetland and the landscape patterns. The study established the coastal wetland landscape dynamics simulation model based on the ecological processes to further reveal the evolution pattern of the coastal wetland landscape under the difference of the natural and humans.. The future trend of the coastal wetland landscape is forecasted by simulating the different man-made management methods. To coordinate the protection and rational exploitation and utilization of the coastal wetland, the wetland ecological function maintenance mechanism, the wetland protection and management control measures were also put forward.	

Monitoring of Endangered Birds in Jiangsu Wetland	Green Jiangsu (2015)	Provincial	Jiangsu is rich in wetland resources, especially in the coastal areas of Yancheng has a vast beach wetlands, is China's largest coastal wetland wetlands. Because of its presence in the East Asian migratory route, millions of migratory birds are parked here every year. Jiangsu wetland endangered birds monitoring to be selected in the province a number of monitoring points, wetland bird monitoring, which in Yancheng coastal wetlands from Dongtai to Xiangshui were set up monitoring sites, regular monitoring of waterfowl species and population.	Lu Changhu
The Impact of Spartina alterniflora on Red - crowned Crane in Yancheng City	31670432	National	The Impact of invasion of Spartina alterniflora on red - crowned crane in Yancheng National Nature Conservation. Based on the analysis of habitat types and distribution patterns caused by the invasion and expansion of Spartina alterniflora, the habitat selection mechanism of red - crowned cranes and the distribution pattern and availability of food (especially benthic animals) And to discuss the protection response of the red-crowned crane habitat in the protected area and the protection of the overwintering population.	
Study on the Variation Characteristics and Correlation of Sulfur and Methane Fluxes on the Gradient	41271122	National	Based on the research of the Ministry of Science and Technology and the Project the National Natural Science Fund, the project team, relying on the Eco-and Environmental Laboratory, has conducted research on the carbon, nitrogen, sulfur and chlorine elements in the coastal areas of northern Jiangsu since 2000. In order to solve the problem of regional demand and scientific research, this paper carried out the research on the elemental cycle of the salt marsh ecosystem and its response to regional climate	Wang Jinxin

of the Salt Marsh and Vegetation Interaction in Coastal Zone			change, and achieved gratifying achievements. The paper has been published in the famous journals of geology and ecology and the trained a group of graduate students and young scientific and technical personnel, to build an active research team.	

Study on the Protection Plan of Biodiversity in Shanghai Binhai Protected Area	31600437	National	1) Impact of sea level rise on coastal nature reserves The rise in sea level will have direct and indirect effects on coastal protected areas, including direct impacts including coastal wetlands and rising habitat of biological habitats, including indirect habitat and changes in priority protected areas. This study will account for changes in the area of different land cover types such as water bodies and wetlands in the case of a specific height rise at sea level.The habitat of some rare species such as red-crowned cranes, black-headed gulls, black-faced spoonbills and Pere David's in this research project will be affected by sea-level rise. This study will be based on the species habitat model (MaxEnt; Phillips et al., 2006) to simulate changes in habitat before and after sea level rise. The species habitat model is based on the ecological attributes of the species, land cover and other relevant spatial data Species spatial distribution model. Through the selection of indicative species in protected areas, the species habitat model can be used to clearly identify the impact of habitat rise by sea level. 2) Identification of priority protected areas adapted to sea level rise Priority areas will change as sea levels rise, and to accommodate this change, protected areas need to be adjusted to effectively protect biodiversity. In this study, the conservation planning software Marxan (Ball et al., 2009) will be used to identify the priority protected areas before and after sea-level rise. The identification of priority areas prior to sea-level rise can be used to evaluate the status of protected areas and to analyze	Zhu Mingjian

			existing Whether the area can effectively protect biodiversity and the identification of priority protected areas after sea-level rise can be adjusted for the adaptation of protected areas to sea-level rise (eg, expanding the area of existing protected areas, adding new protected areas Etc.) to provide scientific decision-making basis.	

Artificial breeding of red-crowned crane wild release and tracking (National Natural Science Fund Project)	31470460	National	Grus japonensis is a genus of Gruiformes, Gruidae, Grus, and a national first-class protected animal. The number of wild populations is only about 2 600, distributed in Russia, Japan, Korea, Korea and China. At present, China's captive red-crowned crane population of 1 248, distributed in the China Zoo Association 62 member units. Zoo is an important base for ex situ conservation of wild animals. The size of the domestic population of red-crowned cranes has been sufficient to support the project of red-crowned crane, which provides animal sources for the re-introduction of red-crowned crane. Work situation: in November 2013, December and January 2015, March, in Yancheng National Nature Reserve (14) and Heilongjiang Lindian Nature Reserve (2) released a total of 16 captive red-crowned cranes The use of satellite transmitter signal transmitter (PTT) and field direct observation method for tracking monitoring research. At present, the main task is to track the survival of the wild red-crowned crane, the selection and utilization of the habitat of the flying crane, the analysis of the feeding habits, the wildness of the red-crowned crane, and the associated species. According to the experience of the American Crane, if the red-crowned crane fails to migrate to the northern breed with wild boils, it is possible to establish non-migratory populations in the Yancheng Sanctuary and to reproduce locally in the Yancheng Nature Reserve.	Cui Duoying(Zhang Jinguo)

Reproductive Countermeasures and Ecological Adaptation of Black - headed Gull in Constructed Wetland	31372226	National	In this project, the breeding ground of black-headed gulls in typical artificial and natural wetlands was selected. The field monitoring and control experiments were used to quantitatively analyze the selection of nests in artificial and natural wetlands, anti-predation strategy and breeding success rate. This paper analyzes the occurrence mechanism of the black sheep gull marriage system and the number of eggs in the supernatant. The multidimensional statistical analysis and model simulation are used to study the ecological adaptation mechanism of the different breeding strategies of the black gull in the constructed wetland. The results provide a scientific basis for the management, restoration and reconstruction of black-headed gull populations and their habitats in different constructed wetlands, and provide reference for revealing the evolutionary theory of breeding behavior of birds and birds.	Jiang Hongxing
Distribution and Migration of Important Birds in Eastern Coastal Areas	2016YFC1201900	national	A total of 2-3 species of important waterfowl population, habitat characteristics and migration patterns were collected. Combining the results of pathogenic microbiological examination of collected samples, the target waterfowl was carried out to carry known and the spread of unknown pathogenic microorganisms and epidemic risks; in accordance with the needs of the project, to provide sub-project tasks related to the distribution of wild animals and electronic Atlas.	

Phosphorus Adsorption and Desorption of Soil in Coastal Tidal Flat and Its Response to Cover Change / Salinity Dynamics	41301551	National	There are still some systematic experimental studies on the influence of the development of coastal beach development, reclamation and other human activities on the key biological geochemical processes of the beach elements. The project is based on the typical coastal beach soils in Yancheng area. Phosphorus is the representative source factor, soil and water interface adsorption and desorption are the key biogeochemical processes. Through the analysis of phosphorus in the water- Control factors, the project reveals the impact of human activities on key biogeochemical processes of the elements of coastal beach. To provide a basis for the protection and rational development of coastal tidal resources, the project seeks to take into account the land demand and coastal ecological protection of sustainable development.	Liu Yang
Study on Environmental Behavior and Flux Model of Heavy Metal Contaminants in Coastal Wetland of Jiangsu Province	BK20131219	Province	In this study, shoal wetland of Yancheng in Jiangsu was used to study the environmental behavior of heavy metal contaminants in the system with Pb and Cd as heavy metal pollution elements, and the input flux and sedimentation records of heavy metal contaminants from human genes were obtained. The sedimentary flux of heavy metals in the wetland of the shoal is estimated, and the sedimentary flux model of the wetland element is established. The scientific basis and technical support for the chemical research, pollution evaluation, environmental management and economic development of the whole coastal beach wetland are established.	Zhang Yingying

Water, Soil and Gas Monitoring in Yancheng National Nature Reserve			Based on the objective observation of surface water, soil and air pollution in Yancheng National Nature Reserve, the pollution level and environmental quality of Yancheng National Nature Reserve were analyzed and evaluated by detecting the main physical and chemical parameters of surface water, soil and atmosphere. District key pollutants and key sources of pollution. On this basis, the paper put forward to improve the environmental quality of protected areas and reduce the risk of countermeasures and recommendations for the protection of protected areas to provide scientific basis and decision support.	Fu Qiang
A Scientific Investigation of Yancheng National Nature Reserve		Natural Reserve Project	To carry out scientific investigation work in the Yancheng National Nature Reserve, investigation includes: A. plant resources; investigation of benthic animal B.; C. fish survey; D. mammal survey; E. (types of migratory waterbirds in migratory waterfowl habitat survey, the number of master reserve distribution and activities of migratory waterfowl).	Li Bo

Geographical Patterns and Prediction of the Effects of Plant Invasion on the Vegetation and Its Related Carbon Processes in China's Coastal Salt Marsh Wetland	41630528	National	Coastal salt marsh wetlands are an important guarantee for the ecological security of the densely populated coastal zone, but the evolution of the structure and function of the system is considered to be closely related to the impact of invasive species. The purpose of this project is to study the distribution and structure of the indigenous salt marsh wetland in China, and to study the vegetation distribution and structure of the indigenous algae, underground carbon storage and its stability and related ecosystem processes, revealing the geographical variation pattern and causes of its impact. On the basis of this, the pattern of carbon process of coastal saline marsh wetland ecosystem in China was discussed through simulation, and the trend of carbon sink / source in salt marsh wetland under the background of plant invasion was predicted based on future climate change scenarios. Based on the national comparison of the impacts of the invasive species, this project not only understands the dynamics of carbon sinks / source in the salt marsh wetland under the background of plant invasion, but also helps to reveal the basic characteristics of carbon processes in China's salt marsh wetlands, Understanding of Spatial Differentiation and Maintenance Mechanism of Carbon. In addition, through the implementation of this project, we expect in the global changes and biological invasion and other fields to achieve important original results, the formation of a certain academic reputation of the research team, and promote the scientific management of China's salt marsh wetlands.	

Effects of Ground and Underground Carbon Input on Soil Food Net of Spartina alterniflora	41371258	Natinonal	Soil decomposers, as the main performers of the decomposition process of ecosystems, interact with each other and coordinate with each other and play an important role in the decomposition of litter, which in turn affects the carbon and nitrogen cycle of soil food webs. We studied the soil nematode and soil microorganism as the research object by carrying out the investigation of the coastal wetland in eastern China, including Yancheng National Nature Reserve. At the same time, we collected the litter of Spartina alterniflora In order to comprehensively and comprehensively understand the effect of alien plant Spartina alterniflora on the decomposition process of invasive ecosystem. At the same time, under the background of global climate change, the factors such as comprehensive climate, littering and physicochemical properties and decomposing group were established. More accurate understanding of alien invasive plants Spartina littoral litter decomposition mechanism, in order to assess the ecological consequences of invasive plants to provide a scientific basis。	

Effects of Increased Exogenous Nitrogen Input and Plant Invasion on Key Processes of Alkaline Carbon Cycle and Its Mechanism	31670491	National	The increase of exogenous nitrogen input and plant invasion poses a serious threat to the global and ecological environment of our country, especially in sensitive ecosystems such as salt marsh. The results show that the increase of exogenous nitrogen input can promote plant invasion, which may exacerbate the impact of plant invasion on indigenous ecosystem processes. However, the potential causes and intensity of this impact are yet to be further explored. In this project, the Yangtze River estuary salt marsh was used as the research site, and the alien plant Spartina alterniflora and the indigenous plant reed were widely used as the research materials. Through the field control experiment, the invasive plants (Soil carbon and its components, etc.), stability (soil respiration, functional microbial community and its activity, etc.) at different stages of the replacement of almond carbon in different stages of indigenous plants, revealing global nitrogen effects of plant Invasion on the carbon cycle of ecosystem and Its mechanism under the Background of General Elevation. This study will facilitate understanding of the carbon cycle of sensitive ecosystems under the influence of exogenous nitrogen input and plant invasion, and provide a theoretical reference for predicting the carbon processes of ecosystems in the context of global change.	Nie Ming

5.i-1-2 Scientific Research Program

Existing partners include Beijing Forestry University, Fudan University, Nanjing Normal University, Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, Nanjing Forestry University, Nanjing Environmental Science Research Institute of the Ministry of Environmental Protection, Beijing Zoo, Yancheng Institute of Technology, Yancheng Normal College, Jiangsu Forestry Bureau and other units. In order to make a detailed comparison with similar types of heritages domestic and abroad, the nominating authority will also expand and strengthen cooperation with relevant international organizations in scientific research projects.

(1) Basic scientific researches

1) The background investigation and comprehensive scientific monitoring of the resources of the nominated properties, such as natural conditions, flora and fauna and species, geological and geomorphological observation, the cultural history and social basic situation investigation of the nominated properties.

2) Long - term location monitoring of representative ecosystems of nominated properties, such as habitat monitoring and management of migratory birds, species dynamics and habitat management of key protected birds such as red-crowned cranes, spoon-billed sandpiper, Pere David's Deer population dynamics, coastal wetland vegetation succession research, through remote sensing data and field monitoring and investigation data to establish GIS database, monitoring vegetation changes, wetlands dynamic monitoring and analysis.

3) Through the geological history period, and the interaction of the river and

tidal current, a lot of researches will be conducted in the field of the formation of radial sand ridges, dynamics, hydrodynamic changes and geomorphologic prediction, remote sensing analysis of sea surface flow field, sediment distribution simulation.

4) On the basis of cooperation of international and domestic scientific researches, we will focus on the comprehensive factors that affect the wintering population of red-crowned cranes. Especially, some 200 Pere David's Deer have a deep influence on the winter habitat and night habitat of red-crowned cranes.

(2) Management application research

1) Natural science research: including biodiversity, geology and geomorphology, disaster prevention and control and other related fields. Research on effective protection and scientific utilization of biodiversity, including tracking application of migratory birds, stopover habitat, artificial breeding of Pere David's Deer, research on dynamic management of landscape ecological network of nominated properties, dynamic change of landscape of nominated properties, etc. From large spatial scales, coastline dynamic caused by global climate change may have a significant influence on biodiversity in Yancheng reserve effect and dynamic effect of red-crowned cranes wintering population, which would help to develop counte rmeasures.

2) Social science research: the scientific researches will be focused on the relationship between the nominated properties and social economy; impact studies about National and local government policy benefits, rules of relevant international organizations (such as the United Nations Framework

Convention on climate, the United Nations environment development programme) on protection and development; study on the influence of traditional culture and community development on the ecological environment system of the nominated properties; study on the influence of human activities on animal and plant habitat and animal activities; study on tourism activities, development patterns and tourism management of nominated properties; research on the number of people, behavior impact on the environment, the degree of research.

3) Conservation management researches: socio - economic development planning and community development researches for nominated areas. Study on the protection and management of nominated properties; research on the construction of geographical information system for the nominated properties; research on scientific research cooperation and experimental base construction of nominated properties, coordination mechanism of local residents and social forces involved in protection, supervision and management.

5.i-2 Heritage display

In the nominated properties, the traditional and modern media means to and have been used to promote their advocacy and to show display activities mainly in the following ways:

(1) To promote the contents of the World Natural Heritage, through the text, pictures, multimedia, physical and other ways to publicize the heritage value, heritage resources protection, ecological and environmental protection and other aspects of science knowledge.

Existing facilities of the nominated properties:

- Exhibition Center of Jiangsu Yancheng National Nature Reserve

At present, in the experimental area of Jiangsu Yancheng National Nature Reserve has been established to show a display center where completes the construction area of 9600 m^2. The exhibition center introduces the basic situation of the protected area through sound and video, as well as the natural survival of the birds and beasts in the protected area. At the same time, the sample hall has collected more than 180 kinds of bird specimens, showing birds diversity of nominated properties, and restoring the wetlands of the typical living environment of waders.

- Exhibition Center of Jiangsu Dafeng National Nature Reserve

Jiangsu Dafeng National Nature Reserve is located in the China Pere David’s Deer park, an area of 2100 m^2, the exhibition room mainly describes the distribution of Pere David’s Deer, growth process and habits, while displaying the Pere David’s Deer and other wild animal specimens. There is a special audio-visual studio, broadcast special feature film " Pere David’s Deer hometown".

- Exhibition Center of Yancheng Yellow Sea Wetlands

Exhibition Center of Yancheng Yellow Sea Wetlands is located at the entrance of China Pere David’s Deer park,, with an area of 700 m^2. The exhibition introduces the basic information, formation mechanism, biodiversity, protection and management, and culture of Yancheng Yellow Sea Wetlands.There are special films in the exhibition hall, showing the rich biodiversity of the Yellow Sea Wetlands in Yancheng, and a large sand table, showing the species composition of different habitats.

● Identify signs:

The identification facilities other than the display and promotion of buildings are mainly distributed along the route.

● Warning signs:

Warn visitors not to pursue wild animals to chase intimidation; an important area of wildlife habitat to emphasize and remind the road vehicles to pay attention to ban, slow down.

● Publicity signs:

Include the promotion of Yellow Sea wetlands resources value of Yancheng, the publicity is enhanced in the concept of protection.

(2) The use of television, radio, network, press release and other means to widely publicize the heritage of the nomination of outstanding natural quality and important scientific and aesthetic value, and enhance public awareness of the protection of heritage sites.

Table 5-7 Media Report and Documentaries of Nominated Properties

Time	Name	Contents
1999	Vast Wetland	Describe the pleasurable sight of Yancheng National Nature Reserve
2005	Graceful Red-Crowned Crane	Life history traits of Red-Crowned Crane in Jiangsu Yancheng National Nature Reserve
2013	Song of Red-Crowned Crane	Life history traits of Red-Crowned Crane in Jiangsu Yancheng National Nature Reserve

Time	Name	Contents
2017	Birds of China	Bird Propaganda film of State Forestry Bureau
2017	Red-Crowned Crane reproduced naturally	People's network: The successful natural reproduction of red - crowned crane for the first time in Yancheng, Jiangsu province
2017	Baby Red-Crowned Crane was born through human incubating	Yancheng Evening Newspaper: Baby Red-Crowned Crane was born through human incubating for the first time in Yancheng, Jiangsu province
2006	Return of Pere David's Deer	CCTV: The history of return of Pere David's Deer
2016	Re-introduced into the wild habitat of Pere David's Deer	CCTV13: the 30th anniversary of the return of Dafeng Pere David's Deer and the success of wild breeding ceremony
2017	The fight for the King Deer	CCTV:The process of the fight for the King Deer in the Jiangsu Dafeng National Nature Reserve
2018	The fight for the King Deer	Yancheng Radio and Television Station

5.j Staffing levels and expertise

At present, Jiangsu Dafeng National Nature Reserve has a total of 85 staff, Jiangsu Dafeng National Nature Reserve has a total of 100 staff, and Tiaozini wetland management office has a total of 15 staff. The two protected area administrations conduct regular business, legal and cultural assessments with the following training activities.

Scientific research personnel got involved in international important wetland protection training, management planning, ecological monitoring and learning

in the recent years. Executive staff participated in the training of terrestrial wild animal epidemic disease surveillance. Two nature reserves invited Yancheng Normal College Associate Professor, Jiangsu Guolei Law Firm lawyers conducted legal education and study for all employees.

Also, two nature reserves carried out the red-crown crane cultural academic reports, eco-tourism cultural products exchange. Eight environmental monitoring staff were sent to the environmental monitoring team to carry out business training and coping ability of environmental issues. 5 staff participated in the UAV flight patrol training and 2 staff participated in the professional skills training such as yachting training.

Table 5-8 Staff and organization structure

Management Bureau	Division							
	Directors	Administrative	Patrolling	Research	Communication	Community	Tourism	Total
Jiangsu Yancheng Nature Reserve	5	17	19	3	2	3	36	85
Jiangsu Dafeng Nature Reserve	2	4	2	14	2	6	70	100
Tiaozini Wetland Management Office	2	3	3	2	1	2	2	15

Management Bureau	Education				
	Master	Bachelor	College	Vocational	Total
Jiangsu Yancheng Nature Reserve	2	28	30	25	85
Jiangsu Dafeng Nature Reserve	8	30	52	10	100
Tiaozini Wetland Management Office	/	5	8	2	15

6. Monitoring

6.a Key indicators for measuring state of conservation

The monitoring contents mainly cover the following aspects and establish the corresponding monitoring index system for the nominated properties inYancheng (see Table 6-1).

A total of seven categories of monitoring sites, bio-ecological, environmental conditions, natural beauty, geology and geomorphology, earthquake activity, tourism activities, illegal activities and community status monitoring were set up under 8 stations of protection and management.

1. **Bio-ecological monitoring**: using the methods of fixed sample plots (transacts) and tracking monitoring, the contents of monitoring are: the number of species and habitat of endangered species such as Red-crowned crane, Oriental White Stork, Black-faced Spoonbill, Spoon-billed Sandpiper, Pere David's Deer and Chinese River Deer in the nominated properties, as well as the epidemic disease, the population of migratory birds, the status of habitat vegetation, and so on.

2. **Environmental monitoring**: using of location monitoring methods, the contents of monitoring are: meteorological, atmospheric environment, water environment, sound environment, solid waste, soil environment and other aspects of environmental monitoring.

3. **Geological and geomorphological monitoring**: using of positioning monitoring methods, the contents of monitoring are: regular monitoring for the key geological features of the sensitive regions, and so on.

4. **Earthquake activity monitoring:** using of positioning monitoring methods, the contents of monitoring are: regular monitoring for the key earthquake features of the sensitive regions, and so on.

5. **Tourism activities monitoring**: With the data of tourist center, the contents of monitoring are: the number of visitors, road traffic conditions, visitors safety and other aspects.

6. **Illegal activities monitoring**: by the patrol and remote sensing technology, the contents of monitoring are: indiscriminate hunting, excavation of silkworm, illegal sewage and so on.

7. **Community status monitoring**: by means of manual investigation, the contents of monitoring are: the production and living conditions, construction and related socio-economic indicators of local residents.

Table 6-1 List of monitoring indicators in planning

Monitoring index	Monitoring period	monitoring methods	Data storage unit
1. Biological monitoring			
1.1 Distribution and quantity of vegetation community	Monthly	Manual monitoring / Automatic equipment monitoring / Remote sensing monitoring	Administration of Jiangsu Yancheng National Nature Reserve; Administration of Jiangsu Dafeng National Nature Reserve; Nanjing University, Fudan University and other institutions.
1.2 The number of key species in migratory birds	Half monthly during migration		
1.3 The habitat of key species in migratory birds			
1.4 Population dynamic of wintering bird species	Half monthly during winter		
1.5 The habitat of wintering bird species			
1.6 Epidemic disease of avian	Monthly		
1.7 Epidemic disease of Pere David's Deer			
2. Environmental monitoring			
2.1 Meteorological conditions (including air pressure, temperature, wind direction, wind speed, humidity, precipitation,	Daily	Automatic equipment monitoring	Bureau of Meteorological in Yancheng; Bureau of Environmental

Monitoring index	Monitoring period	monitoring methods	Data storage unit
sunshine, ground temperature)			Protenction in Yancheng; Bureau of Water Resource in Yancheng.
2.2 Noise			
2.3 Surface water quality, water level	Monthly		
2.4 Ground water quality			
2.5 River bank erosion			
2.6 Soil physical and chemical properties			
3. Geological and geomorphic monitoring			
3.1 Geological feature	Yearly	Equipment monitoring	Bureau of Land and Resources in Yancheng
3.2 Coastline and geomorphology monitoring		Remote sensing monitoring	
4 Seismic activity monitoring			
4.1 Seismic zone and fault monitoring	Yearly	Equipment monitoring	Yancheng Earthquake Bureau
5. Tourism status monitoring			
5.1 Tourists quantity	Daily	Manual monitoring / Automatic equipment monitoring	Administration of Jiangsu Yancheng National Nature Reserve; Administration of Jiangsu Dafeng National Nature Reserve.
5.2 Traffic			
5.3 Tourist s safety status			
5.4 Quality of tourist service facilities	Yearly		
6. Illegal activity monitoring			
6.1 Illegal hunting	Daily	Manual monitoring / Automatic equipment monitoring	Administration of Jiangsu Yancheng National Nature Reserve; Administration of Jiangsu Dafeng National Nature Reserve.
7. Community status monitoring			
7.1 Community population	Yearly	Manual monitoring	Administration of

Monitoring index	Monitoring period	monitoring methods	Data storage unit
dynamics			Jiangsu Yancheng National Nature Reserve; Administration of Jiangsu Dafeng National Nature Reserve.
7.2 Construction in the community			

6.b Administrative arrangements for monitoring property

In order to ensure that nominated properties could be protected and managed in sustainable manner, a multi-level monitoring system has been established to cover various aspects, which include the relevant management organizations of forestry, tourism, environmental protection, water conservancy, land resources, statistics and institutions of universities. The agencies carry out their duties, respectively so that of the monitoring and management work the heritage nomination sites can be carried out efficiently and orderly.The administrative units responsible for the monitoring of the nominations are mainly composed of the relevant departments of the Yancheng Municipal People's Government and the relevant departments of the Tinghu District, Dafeng District, Sheyang County, Dongtai Municipal Government and the administrative organ of the protected area where the nominees are nominated in Table 6-2.

Table 6-2 List of local administrative units responsible for monitoring heritage nomination

Monitoring Department	Contact Information		
	Telephone	Address	Postal Code
Administration of	+86-0515-	Wanghe Road 8, Xinyang	224057

Monitoring Department	Contact Information		
	Telephone	Address	Postal Code
Jiangsu Yancheng National Nature Reserve	82642202	Harbor, Tinghu District, Yancheng, Jiangsu, China	
Administration of Jiangsu Dafeng National Nature Reserve	+86-0515-832393017	Caomiao Town, Dafeng District, Yancheng, Jiangsu, China	224136
Bureau of Environmental Protenction in Yancheng	+86-0515-86660716	Shiji Avenue 21, Xindu Street, Tinghu District, Yancheng, Jiangsu, China	224008
Bureau of Environmental Protenction in Tinghu District	+86-0515-66690357	Xiwang Avenue 59, Tinghu District, Yancheng, Jiangsu, China	224008
Bureau of Environmental Protenction in Dafeng Distric	+86-0515-83513342	Xingfu West Avenue 7, Dafeng District, Yancheng, Jiangsu, China	224100
Bureau of Environmental Protenction in Sheyang County	+86-0515-82323771	Jiefang Road 52，Sheyang County, Yancheng, Jiangsu, China	224300
Bureau of Environmental Protenction in Dongtai City	+86-0515-85212259	Jinhai Road 1, Dongtai City, Yancheng, Jiangsu, China	224200
Bureau of Urban and Rural Construction in Yancheng	+86-0515-88423711	Jiefang South Road 150, Yancheng, Jiangsu, China	224005
Bureau of Urban and Rural Construction in Tinghu District	+86-0515-88333316	Airport road and Xinhe road junction, Tinghu District, Yancheng, Jiangsu, China	224000
Bureau of Urban and Rural Construction in Dafeng District	+86-0515-83535353	Jiangkang East 82, Dafeng District, Yancheng, Jiangsu, China	224100
Bureau of Urban and	+86-0515-2322214	Renmin West Road 66,	224300

Monitoring Department	Contact Information		
	Telephone	Address	Postal Code
Rural Construction in Sheyang County		Hede County, Yancheng, Jiangsu, China	
Bureau of Urban and Rural Construction in Dongtai City	+86-0515-85213809	Guangchang Road 8, Dongtai City, Yancheng, Jiangsu, China	224000
Bureau of Land and Resources in Yancheng	+86-0515-88334564	Yulong East Road 59, Tinghu District, Yancheng, Jiangsu, China	224002
Bureau of Land and Resources in Tinghu District	+86-0515-88320279	Ping'an Road 1, Kaifang Avenue, Tinghu District, Yancheng, Jiangsu, China	224000
Bureau of Land and Resources in Dafeng Distric	+86-0515-83523066	Xingfu West Road 9, Dafeng District, Yancheng, Jiangsu, China	224199
Bureau of Land and Resources in Sheyang County	+86-0515-82323081	Renmin Road, 43, Sheyang County, Yancheng, Jiangsu, China	224300
Bureau of Land and Resources in Dongtai City	+86-0515-85214613	Land Mansion, Jinhai East Road 1, Dongtai City, Yancheng, Jiangsu, China	224200
Yancheng Meteorological Bureau	+86-0515-88412348	Daqing Middle Road 33, Tinghu District, Yancheng, Jiangsu, China	224005
Bureau of Meteorological in Tinghu District	+86-0515-88412348	Airport Road 19, Nanjiang County, Tinghu District, Yancheng, Jiangsu, China	224005
Bureau of Meteorological in Dafeng District	+86-0515-83812184	Xingfu East Road 4, Dazhong County, Dafeng District, Yancheng, Jiangsu, China	224000
Bureau of Meteorological in Sheyang County	+86-0515-82312915	100 m west of the intersection of Chenguang Road and Jiefang West Road, Sheyang County, Yancheng, Jiangsu, China	224300
Bureau of Meteorological in	+86-0515-85224142	Jinhai Middle Road 9, Dongtai City, Yancheng,	224200

Monitoring Department	Contact Information		
	Telephone	Address	Postal Code
Dongtai City		Jiangsu, China	
Bureau of Water Resources in Yancheng	+86-0515-88334979	Yulong East Road27, Tinghu District, Yancheng, Jiangsu, China	224002
Bureau of Water Resources in Tinghu District	+86-0515-66690431	Xiwang Road 59, Tinghu District, Yancheng, Jiangsu, China	224002
Bureau of Water Resources in Dafeng District	+86-0515-83513651	Xingfu West Road, 5-2, Dafeng District, Yancheng, Jiangsu, China	224000
Bureau of Water Resources in Sheyang County	+86-0515-82352267	Jiefang East Road, Sheyang County, Yancheng, Jiangsu, China	224300
Bureau of Water Resources in Dongtai City	+86-0515-85212213	Guangchang Road 6, Dongtai City, Yancheng, Jiangsu, China	224200

6.c Results of previous reporting exercises

In order to better understand the resource value of nominated properties in Yancheng, and carry out the protection and management work of the nominated properties more efficiently, the management departments of nominated properties cooperate with universities and scientific research institutions to preceed a lot of scientific researches on its unique resources and value of monitoring work, which involve mammals, birds, amphibians, reptiles, fishes, benthic, plants. In addition, monitoring schedule includes ecological survey, food webs, etc. The scientific decision-making basis will be provided to the conservation and management for the nominated properties.

Table 6-3 Previous monitoring results for heritage nomination sites

Name	Content	Finisher	Publication or data storage
Asia Water Birds Census Jan, 1990	Wintering water birds, 102species 231876 birds	Mark Barter	Wetlands International
Asia Water Birds Census, Jan.8-10, 1991	Wintering water birds 120 species, 291758 birds	Yancheng Nature Reserve	Wetlands International
Asia Water Birds Census Nov-Dec., 1991	Wintering water birds 122 species, 299096	Yancheng Nature Reserve	Wetlands International
Asia Water Birds Census middle Jan, 1993	Wintering water birds 65 species 183610 birds	Wang Hui	Wetlands International
Asia Water Birds Census Jan. 1994	Wintering water birds 49 species 100443 birds	Wang Hui	Wetlands International
Asia Water Birds Census Feb 1995	Wintering water birds 61 species 81167 birds	Wang Hui	Wetlands International
Asia Water Birds Census 1996	Wintering water birds 70 species 114493	Wang Hui	Wetlands International
Asia Water Birds Census 2004	Wintering water birds 63 species 105741	Mark Barter, Cao Lei, Lei Gang	Wetlands International
Asia Water Birds Census 2006	Wintering Water Birds 54 species 74109 birds	Mark Barter, Wang Hui	Wetlands International
Yancheng Coastal Wetlands and Its Protection of Biodiversity	It holds 559 species of wild plants, 31mammals, 394 birds, 8 amphibians and 26 reptiles, 284 fishes, 508 insects, 325 invertebrate inter-tide, and 89 zooplanktons	Lv Shicheng，Sun Ming, Deng Jindong, Wang Hui, Chen Hao, Gao Zhidong, Li Chunrong	Agro Environment and Development 2007

Name	Content	Finisher	Publication or data storage
The changes of erosion or progradation of tidal flat and retreat or extension of wetland vegetation of the Yancheng coast, Jiangsu	The changes of erosion or progradation of tidal flat and retreat or extension of w etland vegetation of the Yancheng coast utilizing the satellite images of this coastal area shot in June 1992 , May 2002 and April 2005.	Zhang Xueqin, Wang Guoxiang, Wang Yanhong, Wang Zhiliang	MarineSciences 2006
An Estimation of Aboveground Vegetation Biomass in Coastal Wetland of Yancheng Natural Reserve	The total aboveground vegetation biomass of the study area could then be calculated by the best model.	Tan Qingmei, Liu Hongyu，Zhang Huabing, Wang Cong, Hou Mingxing	Journal of Natural Resource 2013
Study and Analysis on Types of Wetland Vascular Plant Communities andPlantResourcesin Yancheng	Community structure, species diversity and plant resources of wetland vascular plants in Yancheng are studied in by the method of combining the field investigation and analysis.	Zhu Ying	Nanjing Agricutral University 2014
A list of rare wild animals and plants in the Jiangsu Dafeng Pere David's Deer national nature reserve	List of wild fauna and flora in protected areas	Ding Yuhua, Liu Bin	Nanjing Normal University Press 2012
Terrestria Mammals Resources in Yancheng Nature Reserve, Jiangsu Province	Resources of terrestrial mammals, including quantity and distribution	Wang Jialian	Sichuan Journal of Zoology 2009

Name	Content	Finisher	Publication or data storage
Investigation on Distribution of River Decry in Yancheng Nature Reserve	The number of river decry gradually decreased and the river decry gathered toward the center of Yancheng nature veserve.The reason for that was analyzed, and then the protection advice was put forward to offer reference for protecting river decry.	Cheng Hai, Chen Hao, Li Chunrong	Modern Agricultural Science and Technology 2010
The Population and Distribution of Several Waterbird Species around the Coast of Yancheng,Jiangsu Province In Breeding Season	Study the number and distribution of the waterfowl	Chu Guozhong, Hou Yunqiu, Qian Fawen, Liu Xiping, Wang Hui	Scientia Silvae Sinicae 2000
Behavior Time Budget and Activity Rhythm of Saunders' s Gull *(Larus saundersi)*During Different Period of Breeding Cycle at Yancheng of Jiangsu, China	Quantitative study on time budget and activity rhythm of Saunders' s Gull was conducted during different breeding cycle at Yancheng of Jiangsu from 1999 to 2002.	Wang Hongxing, Chu Guozhong, Qian Fawen, Hou Yunqiu	Scientia Silvae Sinicae 2004
Bird nature reserve of Yancheng national nature reserve, Jiangsu province	The distribution of birds in field monitoring, special investigation and bird watching have been analyzed for many years. Nearly 400 species of birds are collected, and the distribution and population quantity of each species are described, and a	Lu Changhu	China Forestry Press 2017

Name	Content	Finisher	Publication or data storage
	large number of photos are provided.		
Avian Diversity in Dafeng Milu National Natural Reserve	Study the avian diversity in Dafeng Milu National Natural Reserve using the line transect method.	LiuBin, Ding Yuhua，Ren Yijun，Xu Anhong，Xie Shengbin，Hou Libing	Chinese Journal of Wildlife 2012
Winter bird community structure and gradient change in different habitats at Xinyanggang Estuary, Yancheng Nature Reserve	Analyze the indicator species, bird community structure and gradient change of wintering birds in different disturbed habitats.	Ruan Demeng, Sun Yong, Cheng Jiawei, Liu Dawei, Lu Changhu	Acta Ecologica Sinica 2015
Community of macrobenthic and shorebirds in Yancheng Nature Reserve	Study the resources status of macrobenthos, analysed the niche of macrobenthos on the tidal flat and the effect of Spartina alterniflora invasion on them. Study the resources status of shorebirds during the northward and southward migration and wintering period and the relationship between macrobenthos and shorebirds in spring and winter.	Hou Senlin	Nanjing Forestry University 2011
The Ecological Research of Macrobenthos Communities in wetland of Yan Cheng Nature Reserve	Analysed and compared the characteristics of macrobenthos communities in each basic habitat in a whole year.	Yu Xiaoyun	Nanjing Forestry University 2010

7. Documentation

7.a Photographs and audiovisual image inventory and authorization form

(i) Photographs

Photo Gallery 1 (Annex 6)

(ii) 35mm slide

50 photos (Annex 7)

(iii) Video disc

DVD disc (Annex 10)

(iv) electronic format photo collection

50 photos can be used on the web, resolution 300dpi, jpg format (Annex 11)

(v) Image list, photo and audiovisual material (use) authorization form (Annex 5)

Table 7-1 Photos and audio-visual materials such as the use of authorization of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

Order	Format (slide/ print/ video)	Caption	Date of Photo (mo/yr)	Photographer/Director of the video	Copyright owner (if different than photographer/director of video)	Contact details of copyright owner (Name, address, tel/fax, and e-mail)	Non exclusive cession of rights
1	Photographs	Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)	2014-2017	Chen Guoyuan Zhao Yongqiang Chen Bin	Chen Guoyuan Zhao Yongqiang Chen Bin	Chen Guoyuan 495982885@qq.com Zhao Yongqiang 447201002@qq.com Address: Wanghe Road 8, Xinyang Harbor, Tinghu District, Yancheng, Jiangsu, China Tel: +86-0515-82642202 Chen Bin 16210700102@fudan.edu.cn Address：G525, Jiangwan Campus, Fudan University, Shanghai, China Tel: +86-21- 021-51630706	Authorized use
2	35mm slide		2014-2017				Authorized use
3	Video disc		2014-2017				Authorized use
4	electronic format photo collection		2017	Yancheng Broadcasting Television	Yancheng Broadcasting Television	Address: Jiefang South Road 176, Tinghu District, Yancheng, Jiangsu , China Tel: +86-515-88436012	Authorized use

7.b Texts relating to protective designation, copies of property management plans or documented management systems and extracts of other plans relevant to the property

7.b-1 Protected Areas

Nature reserves Nature reserves refers to the representative of the natural system, rare and endangered wild animal and plant species of natural concentrated distribution area, has a special significance of natural relics and other protection objects of land, land water or sea area, according to the law to draw a certain area to be special protection and management of the area. Nature reserves are divided into provincial nature reserves and national nature reserves.

National nature reserves Nature reserves which are of typical significance, have significant international influence in science or have special scientific research value are listed as national nature reserves.

Wetland Park Refers to specific areas that can be used for wetland protection, education, scientific research, ecological tourism and other activities for the purpose of protecting wetland ecosystem and rationally utilizing wetland resources.

Nature Reserve Plots The importance of ecological location and obvious ecological function, however it is not suitable to set up wetland nature reserve and wetland park.

7.b-2 Conservation and management plans (copy of the heritage nomination sites)

The nominated properties develop the Conservation and Management Plan

for the world natural heritage nomination sites in Yancheng Yellow Sea Wetlands (Annex 3).

7.b-3 Other relevant plans

(1) Master Plan of Jiangsu Yancheng National Nature Reserve (Environmental Protection Office of Jiangsu Province, 2009)

The plan was formulated in 2009 and approved by Environmental Protection Office of Jiangsu Province. There are fourteen chapters in the plan.

Chapter 1 summarizes the origin of the plan, the basis for the preparation, the guiding ideology and planning principles, as well as the planning scope and time limit.

Chapter 2 describes the basic situation of the protection area. Jiangsu Yancheng National Nature Reserve belongs to wildlife category in the wild animal type. Protection area is on the south side of the estuary of Guan river in north of Chenjiagang Town of Xiangshui County, north of Xiangshui Chenjiagang town of Guan River Estuary, on the north side of the estuary of Sancang river in south of Dongtai City. The western boundary of the area is mostly the old seawall in 50s, where is the part of the appropriate section to move to the west between Xiangshui County and Sheyang County, on the east side of the sea minus 3 m isothermal line for the boundary.

Chapter 3 elaborates the historical evolution and the significance of the protection area, the main object of the protection area and its orientation and evaluation, the evaluation of the functional zoning and the management of the protection area, and the protection status quo.

Chapter 4 sets out the overall objectives of the plan.

Chapter 5 describes resource conservation and management planning.

Chapter 6 deals with research and monitoring programs.

Chapter 7 deals with publicity and education.

Chapter 8 clarifies the rational exploitation and utilization of resources.

Chapter 9 sets out the comprehensive environmental improvement plan.

Chapter 10 clarifies the key construction project planning.

Chapter 11 sets out the administrative planning.

Chapters 12 through 14 illustrate the assessment of investment and the implementation of planned safeguards and benefit analysis.

(2) Master Plans for Jiangsu Dafeng National Nature Reserve (2013-2022) (Forestry Bureau Jiangsu Province, 2013)

Chapter 1 elaborates the background of the project, the basis of preparation, guiding ideology and principles, planning period and so on.

Chapter 2 describes the basic situation of the protected area and the status quo evaluation.

The protected area is situated in the southeast, where borders on gate of Tan Tu and Tun Men in Dongtai City. It is next to the Xin Cao farm in Jiangsu Province. It is connected to the forest farm of Dafeng and the Dongchuan farm in Shanghai on the west, and the north (northeast) is the vast ocean.

Chapter 3 sets out the overall layout of protected areas where includes the nature of protected areas and protection targets, planning objectives, functional zoning and layout of protected areas, and overall layout.

Chapter 4 sets out the planning.

Chapter 5 deals with key construction projects

Chapters 6 through 8 describe investment estimates and fundraising, safeguards and benefit evaluations.

7.c Form and date of most recent records or inventory of property

Table 7-2 List of the latest records and the date or list of properties in the heritage nomination sites

List name	Time
List of vegetation of the Yellow Sea Wetlands of Yancheng,	2017
The animal bird list of Yellow Sea Wetlands of Yancheng	2017
List of mammals of Yellow Sea Wetlands of Yancheng	2017
List of amphibians of Yellow Sea Wetlands of Yancheng	2017
List of reptiles of Yellow Sea Wetlands of Yancheng	2017
List of fish fauna of the Yellow Sea Wetlands of Yancheng	2017
List of zoobenthos of the Yellow Sea Wetlands of Yancheng	2017

7.d Address where inventory, records and archives are held

Table 7-3 Holder Information of the latest record of the Yellow Sea wetlands of Yancheng

Institution	Address	Post code
Jiangsu Forestry Bureau	Dinghuaimen Street 22, Nanjing, Jiangsu Province	210036
Bureau for Jiangsu Yancheng National Nature Reserve	Wanghe Road 8, Xinyang Harbor, Tinghu District, Yancheng, Jiangsu, China	224057
Bureau for Jiangsu Dafeng National Nature Reserve	Caomiao Town, Dafeng District, Yancheng, Jiangsu, China	224136
Beijing Forestry University	Qinghua East Road35, Haidian District, Beijing, China	100083

Yancheng Normal University	South Road of Hope Avenue 2, Yancheng, Jiangsu, China	224007
Nanjing University	Hankou Road 22, Nanjing，Jiangsu, China	210093
Fudan University	Zhangheng Road 825, Pudong New District, Shanghai, China	201203

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8.b Official Local Institution / Agency

8.b-1 National and Provincial Management Authority

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Preface:

Planned Range and Phases of the Serial Nomination for World Heritage Inscription: Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China

The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a serial natural heritage nominated property for the inscription on the World Heritage List, which will be submitted in three phases. This document explains briefly the plan for the range and phases of the serial nomination.

1. Global interests

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China are located in the Yellow Sea ecoregion, which attracts massive attention from the global conservation community.

The coast of Yellow Sea-Bohai Gulf contains the world's largest continuous mudflat seashore. Sediments and nutrients are continuously discharged from the Yellow River and Yangtze River (two of the world's longest ten rivers) and other rivers including Yalu River, Liao River, Luan River and Hai River, and form fertile mudflats, radial sand ridges and sandbanks. These intertidal landforms, together with sand dunes, lagoons, rocky shores, and islands, provide diverse habitats for migratory birds. Nowadays, the dynamic process of river sediment discharge and continental shelf sedimentation continues to shape the geological landscape and ecosystem on the Yellow Sea-Bohai Gulf coast, making it one of the most diverse and fertile coasts in the world, providing key habitats for migratory birds on the East Asian-Australasian Flyway.

The IUCN World Conservation Congress (Jeju, Korea 2012) unanimously agreed on the “conservation of the East Asian-Australasian Flyway and its threatened waterbirds, with particular reference to the Yellow Sea” (Resolution 5.028), highlighting the global importance of the Yellow Sea. Four years later, the IUCN World Conservation Congress (Hawaii, U. S. 2016) again adopted a resolution on the “conservation of intertidal habitats and migratory waterbirds of the East Asian-Australasian Flyway, especially the Yellow Sea, in a global context” (Resolution 6.026), recognising the outstanding universal value of the Yellow Sea region. The resolution also suggested to consider the possibility of World Heritage nomination for the intertidal zone of Yellow Sea, to promote its protection and sustainable development.

The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China World Natural Heritage serial nominated Property are key stopovers, wintering grounds or breeding grounds for some of the world’s most concerned threatened bird species, including two critically endangered water birds: the Chinese crested-tern (Thalasseus bernsteini) with the global population just more than a hundred, the spoon-billed sandpiper (*Eurynorhynchus pygmeus*), with only hundreds of individuals left in the world. Almost all individuals of the Nordmann's greenshank (*Tringa guttifer*), the great knot (*Calidris tenuirostris*), and the Far Eastern curlew (*Numenius madagascariensis*) depend on these habitats.

2. China’s responsibility

As the major part of the waters and coastline of Yellow Sea ecoregion is located in China (Fig. 1), it is the obligation of the Chinese government to protect the environment in the area. China has been paying special attention to the ecological protection. In the report at the 18th National Congress of the

Communist Party of China, for the first time, ecological civilization strategy has been listed in the national agenda, in line with the previous economic, political, cultural and social development strategies, and has become an important part of the task of building a moderately prosperous society in all respects. This marks a new phase of China's transition of modernization. Against the background of new ecological policies, the protection of oceans and coastal areas has been highly regarded in China.

In February 2017, China submitted to the World Heritage Center "The Coast of the Bohai Gulf and the Yellow Sea of China",which was inscribed on the tentative list of World Heritage, covering fourteen key migratory bird habitats along the coast of Yellow Sea-Bohai Gulf. On 31 March 2017, the State Oceanic Administration of China released the Measures for Coastline Protection and Management, which explicitly established a system to guarantee the retention of the natural shoreline. By 2020, the proportion of retained natural coastline will be no less than 35%. On 17 January 2018, the State Oceanic Administration issued the strictest-ever measures to limit sea reclamation: prohibiting reclamation for commercial real estate development, prohibiting all reclamation in the Bohai Gulf, and cancelling all reclamation projects against the current marine policy which have been approved but not yet carried out.

The measures above provide policy support for the integrity of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China.

3. Component parts planned to be involved in the serial nomination

The Yellow Sea-Bohai Gulf coast contain the world's largest intertidal mudflat, a key node of the East Asian-Australasian Flyway. The East Asian-

Australasian Flyway, among all the main flyways, is used by the largest number of migratory bird species, as well as the largest number of threatened species. Large rivers (Yellow River, Yangtze River, Yalu River, Liao River, Luan River, Hai River etc.) continuously discharge sediments into Yellow Sea and Bohai Gulf, accumulating to form a series of different habitat types such as mudflats, beaches, and salt marshes, providing habitats for various migratory birds. These globally important habitats maintain the amazing bird biodiversity on the East Asian-Australasian Flyway. Following the submission of “The Coast of the Bohai Gulf and the Yellow Sea of China” to the tentative list, we have consulted domestic and foreign experts before planning to nominate the following 16 component parts as World Heritage properties in three phases in the future (locations shown in Table. i):

Table i The components of the Coast of the Bohai Gulf and the Yellow Sea of China

Name of component parts	Central coordinates
(1) Dandong Yalu River Estuary National Nature Reserve, Liaoning	123° 50′30″E, 39°49′01″N
(2) Changhai Provincial Nature Reserve for Rare Marine Life, Liaoning	122°32'56"E, 39°12'56"N
(3) Snake Island-Laotie Mountain National Nature Reserve, Liaoning	121° 10' 25"E, 38° 43' 58"N
(4) Dalian Haibin-Lüshunkou National Park, Liaoning	121° 40' 12"E, 38° 52' 21"N
(5) Shuangtai Estuary National Nature Reserve, Liaoning	121° 48' 26"E, 40° 52' 11"N
(6) Shi River Estuary, Shanhaiguan, Qinhuangdao,	119° 47' 26’’E, 39° 57' 52"N

Name of component parts	Central coordinates
Hebei	
(7) Beidaihe-Geziwo/Xin River Estuary, Hebei	119° 31' 48"E, 39° 53' 4"N
(8) Golden Coast Nature Reserve, Beidaihe New District, Hebei	119°11′38″E, 39°31′38″N
(9) Luannan-Zuidong Coastal Wetland, Hebei	118°09′50″E, 39°08′27″N
(10) Caofeidian Wetland, Hebei	118°16′00″E, 39°02′20″N
(11) Nandagang Wetland in Cangzhou, Hebei	117°30′00″E, 38°30′00″N
(12) Yellow River Delta National Nature Reserve, Shandong	119°02'35"E, 37°48'54"N
(13) Jiangsu Yancheng National Nature Reserve, Jiangsu	120° 37' 23"E, 33°32' 46"N
(14) Jiangsu Dafeng National Nature Reserve, Jiangsu	120°48′57″E, 32°59′03″N
(15) Rudong Coast, Jiangsu	121°07'40"E, 32°42'14"N
(16) Qidong North Branch of the Yangtze River Estuary Nature Reserve, Jiangsu	121° 39' 21"E, 31° 44' 5"N

The planned component parts for the serial nomination are described briefly below:

(1) Dandong Yalu River Estuary National Nature Reserve, Liaoning

The Yalu River estuary, located at the east of Liaoning Province near the border of China and Democratic People's Republic of Korea, is the China’s

northernmost coastal stopover site for water birds, including thousands of great knots, bar-tailed godwits (*Limosa lapponica*) and Far Eastern curlews. It is also identified by BirdLife as an IBA.

(2) Changhai Provincial Nature Reserve for Rare Marine Life, Liaoning

The reserve, located in the waters south of Changshan Islands, is inhabited by marine animals such as the spotted seal (*Phoca largha*), the common minke whale (*Balaenoptera acutorostrata*), the long-tailed duck (*Clangula hyemalis*), the marbled murrelet (*Brachyramphus marmoratus*) and the Chinese egret (*Egretta eulophotes*). The world's largest known breeding ground of Chinese egret is on the Guanglu Island of Changshan Islands.

(3) Snake Island-Laotie Mountain National Nature Reserve, Liaoning

Snake Island is 7 nautical miles northwest of Dadianzi, Shuangdao Town, Lüshunkou District in Dalian, while Laotieshan is in the west of Lüshunkou District. Almost all raptors that breed in Northeast Asia and Japan have to pass Snake Island-Laotieshan on their migration through the Liaodong Peninsula. In addition, the rising sea level and the tectonic subsidence of the Bohai Gulf area have separated the Snake Island from the mainland, leading to the emergence of Shedao Island pit viper (*Gloydius shedaoensis*), a venomous snake endemic to China.

(4) Dalian Haibin-Lüshunkou National Park, Liaoning

The National Park is located in the south of Liaodong Peninsula in Liaoning, facing the Yellow Sea on the east and the Bohai Gulf on the west, adjacent to Snake Island-Laotie Mountain National Nature Reserve. It contains two districts, the Dalian Haibin and Lüshunkou. The coastline mostly consists of steep rocky hills, as well as beaches and freshwater estuary. On the hills grow

secondary pine-oak mixed forests, providing habitats for wild sika deers (*Cervus nippon*), and key stopovers for a large number of raptors and passerines before and after their flight through the Bohai Gulf. In the winter, large number of freshwater birds such as geese and ducks, Oriental storks and hooded cranes (*Grus monacha*) overwinter, and large raptors such as the white-tailed eagle (*Haliaeetus albicilla*) and the Steller's sea eagle (*Haliaeetus pelagicus*) are also found here. In the spring, marine mammals such as the Bryde's whale (*Balaenoptera brydei*) pass through the offshore area during their migration.

(5) Shuangtai Estuary National Nature Reserve, Liaoning

The reserve is located in Panjin, Liaoning, and is the main body of Liao River Delta in the north of Bohai Gulf. Shuangtai Estuary is the southernmost breeding ground and a key migration stopover for the red-crowned crane. Meanwhile, it provides key stopover sites used by over 10% of the population of two endangered large bird species, the Siberian crane (*Leucogeranus leucogeranus*) and the Oriental stork. It is also the largest breeding ground for the threatened Saunder's gull (*Larus saundersi*), more than half of whose individuals breed here. Every winter, hundreds of spotted seals breed in the reserve.

(6) Shi River Estuary, Shanhaiguan, Qinhuangdao, Hebei

The Shi River Estuary is located in the Beidaihe National Park in Qinhuangdao, no more than 1 kilometer away from Laolongtou, Shanhaiguan in the World Cultural Heritage site, the Great Wall. On the Shi River Delta or Shihenan Island, with an area of only 820 hectares, 409 species of bird have been recorded in the last five years, involving various ecological groups of

birds, including most species of threatened birds on the East Asian-Australasian Flyway. On the other hand, the area contains a miniature of various landscapes along the Bohai Gulf coast, including forests, shrubs, grasslands, wetlands, mudflats and beaches, providing breeding grounds for a large number of summer migrants like waders, geese and ducks.

(7) Beidaihe-Geziwo/Xin River Estuary, Hebei

The Geziwo Beach is an intertidal mudflat formed on the Xin River delta, a stopover site for numerous migratory birds. The Geziwo Beach is a world-famous bird watching destination. In addition to a large number of waders inhabiting the area throughout the year, during the migration seasons in spring and autumn, various rare birds migrate through the “Eagle Cape” on the Geziwo Beach, including numerous raptors, cranes (the endangered red-crowned crane and the critically endangered Siberian crane), the Oriental stork and the great bustard (*Otis tarda*). Almost all the rare and endangered birds migrating through the Yellow Sea intertidal zone could be observed here. It is identified by BirdLife as an IBA.

(8) Golden Coast Nature Reserve, Beidaihe New District, Hebei

The Golden Coast Nature Reserve, Beidaihe New District (formerly Changli) is located on the north (left) bank of Luan River estuary. Under the unique hydrological condition in north Bohai Gulf, sandy sediments from the Luan River mainly deposit on the side of the Golden Coast, forming a golden beach tens of kilometers long, and under the unique climate conditions, forming coastal sand dunes several kilometers long and over a hundred meters high. On the inland side of the dunes lies Qilihai, the largest lagoon in the Yellow Sea-Bohai Gulf region. Qilihai is now mainly a habitat for gulls and waders,

and an important wintering ground for relict gulls (*Ichthyaetus relictus*). It is identified by BirdLife as an IBA.

(9) Luannan-Zuidong Coastal Wetland, Hebei

Luannan-Zuidong Coastal wetland is located on the south (right) bank of Luan River estuary. Under the unique hydrological conditions in north Bohai Gulf, muddy sediments from the Luan River mainly deposit on the Luannan side, forming an intertidal mudflat extending tens of kilometers, a foraging ground for numerous waders. During the migration season, Luannan Coastal Wetland is a stopover site for nearly half of the red knot (*Calidris canutus*) individuals on the flyway; it is also a stopover and wintering site of endangered or rare birds such as the Far Eastern curlew and the relict gull.

(10) Caofeidian Wetland, Hebei

The Caofeidian Wetland currently consists of a mosaic of artificial rice fields, salt ponds, fish ponds, and water reservoirs, as well as artificial reed marshes and mudflats. Caofeidian Wetland Park and Tanghai Wetland and Bird Reserve are both located in this area. During the migration season, a large number of geese and ducks, cranes, waders, gulls, raptors and passerines pass by or stop over. In the last two years, numerous Oriental storks migrate through and stop at the Caofeidian Wetland, the number of individuals peaking at over 2,000, accounting for over 80% of the world's existing individuals. The critically endangered Baer's pochards (*Aythya baeri*), also stop over here. In the Caofeidian reed marshes live numerous individuals of a threatened species endemic to China, the reed parrotbill (*Paradoxornis heudei*).

(11) Nandagang Wetland in Cangzhou, Hebei

The Nandagang Wetland in Cangzhou possesses a large area of reed marshes and intertidal mudflat. It is one of the most important stopover sites for the Oriental stork. It is also an important potential habitat for endangered or rare birds such as cranes and the relict gull. It is identified by BirdLife as an IBA.

(12) Yellow River Delta National Nature Reserve, Shandong

Located on the east coast of Shandong, the reserve is consisted of the estuary of the Yellow River and mudflats located at the north of Shandong province. The reserve is the most complete, most extensive and youngest wetland ecosystem of the warm-temperate belt in China. The Yellow River discharges a large number of sediment year by year, increasing the area of the mudflats by more than 1,300 hectares per year in average. The region is a key stopover site for Siberian crane, hooded crane, white-naped crane (*Grus vipio*), common crane (*Grus grus*), whooper swan (*Cygnus cygnus*), tundra swan (*Cygnus columbianus*), waders, black stork (*Ciconia nigra*) on the East Asian-Australasian Flyway, and provides an important wintering ground in North China for red-crowned crane, Dalmatian pelican (*Pelecanus crispus*), Oriental stork, Baer's pochard, and great bustard. In addition, the reserve provides a key breeding ground for hundreds of Oriental storks and thousands of Saunder's gulls. It is identified by BirdLife as an IBA.

(13) Jiangsu Yancheng National Nature Reserve

The reserve located on the middle coast of Jiangsu Province is one of the largest mudflat reserves in China. It inhabits 14 species of wild animals in the National Protected Class-I list, and 85 species in the Class-II list. It supports over 500,000 resident or seasonally resident birds, including over a hundred

species of geese, ducks, waders and cranes, and is the world's largest wintering ground of the red-crowned crane. The reserve is a key transit point for the trans-hemispheric migration where nearly 3,000,000 migratory birds stop over, and is identified by BirdLife as an IBA.

(14) Jiangsu Dafeng National Nature Reserve

The reserve is a typical coastal mudflat wetland, home to over 2/3 of the world's population of Père David's deer (*Elaphurus davidianus*). In the reserve there are 93 species of birds protected by the Agreement between the Government of Japan and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment, including rare birds such as the red-crowned crane, the Saunders's gull and the reed parrotbill.

(15) Rudong Coast, Jiangsu

This area is located on the south coast of Jiangsu Province. The Rudong mudflat is a key stopover site for the critically endangered water bird spoon-billed sandpiper and the endangered water bird Nordmann's greenshank, where every year more than half of the world's population of the two species stop over and moult. It is also a key stopover site of the great knot and the bar-tailed godwit. The Rudong coast also provides an important breeding ground for terns, where the critically endangered bird Chinese crested-tern with a global population just more than a hundred has been witnessed. In addition, the globally unique ocean dynamical structure of south Yellow Sea – the radial sand ridges – are mostly located in the waters near Rudong.

(16) Qidong North Branch of the Yangtze River Estuary Nature Reserve, Jiangsu

The reserve is a coastal wetland formed by the accumulation of sediments discharged from the north branch of Yangtze River, including sandbanks, islands, floodplain, rice fields, channels and other water bodies. It is a highly sensitive region connecting the tropical, subtropical and north temperate zones. The reserve covers the major migration channel of the critically endangered species Chinese sturgeon (*Acipenser sinensis*). As an IBA identified by BirdLife, the region also provides wintering ground for migratory birds such as the red-crowned crane, the Siberian crane, the hooded crane and the Oriental stork.

4. Planned phases

Among the 16 component parts in the serial nominated property of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China, 8 are National Nature Reserves, 3 are National Parks, and 3 are Provincial Nature Reserves. The remaining 2 sites have no legal protection status, but are planned to be established as nature reserves. These two sites with planned protected areas are also the two attracting the most international attention: Luannan-Zuidong Wetlands in Hebei and Rudong Coast in Jiangsu.

The 16 sites are serially nominated for the following reasons:

Firstly, the serial nominated properties are central locations on the East-Asian Australasian Flyway, providing major stopovers, breeding grounds or wintering grounds for the largest number of threatened migratory bird species, especially endangered or critically endangered species. The ecological and hydrological processes are closely connected by marine currents and sediment transportation, and in particular, the 16 component parts, as an integrated marine ecosystem, support the feeding, breeding and migration of fishes and shrimps, which the migratory birds depend on. However, this

region is still a gap in the World Heritage list, despite the existence of large areas of World Natural Heritage sites on the north, south and westernmost parts of the flyway (east South Asia, for example the Sundarbans in Bangladesh).

Secondly, the nominated properties range from north to south covering nearly 10 ° in latitude, from temperate to subtropical zones, involving various types of habitat, including deltas, rocky shores, sandy shores, shell ridges/beaches, as well as reed marshes, seepweed marshes, and intertidal flats. Each component part has its own unique contribution to the outstanding universal value of the serial nomination. In the northernmost part of the serial nomination sites, the coastal islands in Liaoning are breeding grounds for the threatened species Chinese egret and black-faced spoonbill (*Platalea minor*), while in spring and autumn, these islands and coastal rocky hills provide important “stepping stones” for raptors and passerines. The deltas in Liaoning are stopover sites for a large number of the globally threatened species bar-tailed godwits and Far Eastern curlews, and provide the southernmost breeding ground for the endangered bird red-crowned crane. The coastline of Hebei features high diversity, and is a migration corridor for almost all ecological groups of migratory birds. The mudflats on the Hebei coast were the vast delta formed via the historical discharge of Yellow River into the Bohai Gulf until more than a thousand years ago. Nowadays, these mudflats are stopovers for a significant proportion of red knots and almost all Oriental storks in the world, and are also the wintering grounds for almost all relict gulls in the world. The Yellow River Delta in Shandong, on the other hand, belong to the silting coastline newly formed after the Yellow River changed its course back to north in 1855, and is now still undergoing rapid landscape

changes. The Yellow River Delta provide a globally important breeding ground for Oriental storks, as well as a stopover and wintering ground for red-crowned cranes and Siberian cranes. The marine deposition plains and mudflats in Jiangsu are formed by the sedimentation of the Yellow River, the Yangtze River and the Huai River in different historical periods. This area is home to the largest intertidal wetland in the Yellow Sea ecoregion, providing stopovers for some of the world’s rarest waders like the spoon-billed sandpiper and the Nordmann's greenshank, and the most important wintering ground for red-crowned cranes.

Thirdly, the component parts are all located in the Chinese territory, and are all state-owned, ensuring the coherence of management. Besides, they are all located within the Ecological Red Lines designated by the Chinese government, and constitute a major part in the “35% natural coastline” that the Chinese government has proposed to retain. The Chinese government has issued the strictest-ever measures to limit sea reclamation, in order to prevent the excessive fragmentation of natural coastal wetlands.

In summary, the natural conditions and historical events have shaped a large variety of ecosystems and habitats along the Yellow Sea-Bohai Gulf coast, which support different threatened species, maintaining the bird biodiversity on the East Asian-Australasian Flyway.

Considering the various protection status and community conditions, in order to achieve integrated protection of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China as soon as possible in a stepwise manner, we have formulated the following application plan in three phases:

4.1 Phase I

According to the assessment by East Asian-Australasian Flyway Partnership on the importance of 1030 reserves and migratory bird habitats on the flyway, the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast, and are thus suitable for the phase I of the nomination.

The coastal wetlands in Yancheng, Jiangsu are mainly distributed in Tinghu District, Sheyang County and Dafeng County, separated by the Dafeng Harbor into two components: Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1, short for Yellow Sea-I), and the Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2). YS-1 and YS-2 consists mainly of Jiangsu Dafeng National Nature Reserve and Jiangsu Yancheng National Nature Reserve. Meanwhile, the south boundary of YS-1 closely neighbours the Rudong coast of Jiangsu, which attracts international attention, facilitating future expansion of nominated sites.

This phase of the project is scheduled to be submitted to the UNESCO World Heritage Center in January 2018.

4.2 Phase II

The sites on the Bohai Gulf coast will be nominated in Phase II upon the completion of Phase I. The coastline of Bohai Gulf contains the most diverse habitat types in the ecoregion, including estuaries, deltas, sand dunes, mudflats and lagoons. In order to protect the Bohai Gulf, the Chinese government has strictly prohibited all reclamation projects in the area. In addition, a provincial nature reserve will be established in the Luannan-Zuidong coastal wetland, which attracts high international attention.

Table ii The plan of Phase II

Name of component parts	Central coordinates
(3) Snake Island-Laotie Mountain National Nature Reserve, Liaoning	121° 10' 25"E, 38° 43' 58"N
(4) Dalian Haibin-Lüshunkou National Park, Liaoning	121° 40' 12", 38° 52' 21"N
(5) Shuangtai Estuary National Nature Reserve, Liaoning	121° 48' 26"E, 40° 52' 11"N
(6) Shi River Estuary, Shanhaiguan, Qinhuangdao, Hebei	119° 47' 26''E, 39° 57' 52"N
(7) Beidaihe-Geziwo/Xin River Estuary, Hebei	119° 31' 48"E, 39° 53' 4"N
(8) Golden Coast Nature Reserve, Beidaihe New District, Hebei	119°11′38″E, 39°31′38″N
(9) Luannan-Zuidong Coastal Wetland, Hebei	118°09′50″E, 39°08′27″N
(10) Caofeidian Wetland, Hebei	118°16′00″E, 39°02′20″N
(11) Nandagang Wetland in Cangzhou, Hebei	117°30′00″E, 38°30′00″N
(12) Yellow River Delta National Nature Reserve, Shandong	119°02'35"E, 37°48'54"N

4.3 Phase III

The other sites will be nominated in Phase III of the serial nomination, along with the potential new sites suggested by experts and professional institutions, under the condition of official protection and approval by the local stakeholders after negotiating with the local governments.

Summary

The nomination of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) is a key step forward for China in its practice of ecological civilization strategy and contribution to global biodiversity conservation. This is also China’s effort to fill the gap in marine world heritage, and promote the spatial and typological balance of world heritage in the Asian-Pacific region. The serial nomination will be a long-term mission. China is willing to exchange views and cooperate with international communities, to

push ahead with the nomination according to this plan, for the overall protection of East Asian-Australasian Flyway.

Executive Summary

State party	People's Republic of China	
State, province or region	Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) World Natural Heritage Nominated Properties are located in several counties (districts) in Yancheng Municipality, Jiangsu Province, China as below: Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1, short for Yellow Sea-1): Sheyang County, Tinghu District, and Dafeng District The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2, short for Yellow Sea-2): Dafeng District, Dongtai City and Dongsha	
Name of property	Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)	
Geographical coordinates to the nearest second	Range of coordinates	
	Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1)	N 32°49′2.14″-33°11′30.15″; E 120°48′49.37″-121°18′10.47″
	The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2)	N 33°19′6.19″-33°49′10.88″; E 120°29′45.12″-120°48′18.09″

	Central coordinates	
	Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1)	N 33°0′16.14″, E 121°3′29.92″
	The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2)	N 33°34′8.54″, E 120°39′1.60″
Textual description of the boundaries of the nominated property	Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China are located in the Yellow Sea ecoregion, which attracts massive attention from the global conservation community. The Yellow Sea and Bohai Gulf coast contain the world's largest intertidal mudflat, a key node of the East Asian-Australasian Flyway. The East Asian-Australasian Flyway, among all the main flyways, is used by the largest number of migratory bird species, as well as the largest number of threatened species. Large rivers (Yellow River, Yangtze River, Yalu River, Liao River, Luan River, and Hai River etc.) continuously discharge sediments into Yellow Sea and Bohai Gulf, accumulating to form a series of different habitat types such as mudflats, beaches, and swamps, providing habitats for various migratory birds. These globally important habitats have been maintaining the amazing bird biodiversity on the East Asian-Australasian Flyway. Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a serial nominated property for the inscription on the	

	World Heritage List, which will be submitted in three phases. The phase I of the nominated property is composed of two separate component parts in Yancheng, Jiangsu Province, China: Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1) and The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2), located in the southern part of the west coast of Yellow Sea. These areas are nominated to meet the Criteria (ix) and (x), and represent the outstanding universal value of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China. 1. The boundaries of YS-1 are mainly determined according to the typical vegetation zones in this area, as well as the marine and terrestrial habitat types, such as intertidal mudflats and radial sand ridges. The main part of this area is within the range of Jiangsu Dafeng National Nature Reserve and the experimental zone of Jiangsu Yancheng National Nature Reserve. The north boundary starts from Zhugangzha, extends towards east to the north boundary of Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve. The west boundary starts from Zhugangzha, extends towards south along the boundary of reclamation area to Chuandonggang, turns west for 2.18 km, turns southwest to Dongchuan sea dyke, extends along the Chuanxin Road for 2.75 km, reaches the north boundary of reclamation area and turns to south to the north boundary of Tiaozini reclamation area. The south boundary starts from Liangduozha, extends towards east along the planned Tiaozini embankment to the south boundary of Dongsha Experimental Zone. The east boundary coincides with the east boundary of Dongsha Experiment Zone. On the east of the nominated property lies a subtidal mudflat, where there is no fixed artificial facility and the extremely complicated

	hydrological condition makes it very dangerous for small boats, and large ships are not allowed to approach, so it is not necessary to establish a buffer zone on the east side. The buffer zone is mainly located on the west (land side) of nominated property. The north boundary starts from the intersection of Zhugangzha and G228, extends towards east along the river to Zhugangzha. The west boundary starts from the intersection of Zhugangzha and G228, extends towards south along the sea dyke across the river of Dongchuangang, turns west for 2.8 km, turns southeast along X202 road to the boundary of Jiangsu Dafeng National Nature Reserve. From this point, the west boundary extends towards south and ends at the crossroad of G228 and X302. The south boundary starts from the north side of X302 road, extends towards east, extends across Liangduohezha to the -3m isobath. The east boundary starts from where Zhugangzha enters the sea, extends towards south, extends along the boundary of reclamation area to Chuanxin Road, turns west for 2.18 km and then turns southwest to Dongchuan sea dyke. Starting from this point, the east boundary turns towards southeast along Chuanxin Road, then turns south to the north boundary of reclamation area and then turns east for 2.75 km, turns south and reaches the north boundary of Tiaozini reclamation area. 2. The boundaries of YS-2 are mainly determined according to the typical vegetation zones in this area, and the integrity of intertidal mudflat habitats. This component is located within Jiangsu Yancheng National Nature Reserve. The North boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards east for 5 km. The west boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards southeast along the boundary of reclamation area to Xinyanggang estuary and reaches the north boundary of the core area of Yancheng Wetland Rare Birds National Nature Reserve.

	From the south bank of Xinyang Harbor, the west boundary extends 1943 m southwards, turns towards 405 m east of the sea dyke, extends southwards parallel to the sea dyke until the boundary of Dafeng County, extends 100 m southwards to the north bank of Doulong Harbor, then eastwards along the the sea dyke until the boundary of Dafeng County, extends 100 m southwards to the north bank of Doulong Harbor, then eastwards along the bank until the -3m isobath, and turns southward towards the parallel line 3 km south of the eastward extension of Simaoyou River. The south boundary is the parallel line 3 km south of the eastward extension of Simaoyou River, extending eastwards until 5km offshore. The east boundary is the -3m isobath, which marks the boundary of intertidal zone. On the east of the nominated property lies a subtidal mudflat, where there is no fixed artificial facility and the extremely complicated hydrological condition does not allow large ships to approach, so it is not necessary to establish a buffer zone on the east side. The buffer zone is mainly located on the west (land side) of nominated property. The north boundary starts from Huangshagang, extends towards east, turns northeast along the north boundary of the middle section of Jiangsu Yancheng National Nature Reserve to 1.7 km south from Sheyang river estuary. The west boundary starts from Huangshagang, extends southeast along the east side of Huanghuang road, turns south, extends across Xinyanggang along the east side of S331, turns southwest at Zhonglugang, turns south along the Xichao river, turns southeast at Fangqiang Farm along the river, turns east at Dongfanghongqizu, reaches sea dyke road at Doulonggang, turns south to Sanmaoyou river along sea dyke road and G228. The south boundary starts at Sanmaoyou river, extends eastwards to sea dyke road, and extends northwards along the road to the line 3 km south, parallel to eastward extension of Simaoyou River, and reaches the -3m isobath. The east boundary starts at 1.7

	km south from Sheyang river, turns southeast along the boundary of reclamation area, reaches Xinyanggang estuary and the north boundary of the core area of Yancheng National Nature Reserve, The east boundary coincides with the west boundary of the nominated property.
A4 or A3 size map of the nominated property, showing boundaries and buffer zones	Figure 1-1 Location of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in China Figure 1-2 Location of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in Jiangsu Province Figure 1-3 Detailed map of Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1) Figure 1-4 Detailed map of the Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2)
Criteria under which property is nominated	Criteria (ix) and (x)
Draft Statement of Outstanding Universal Value	**a) Brief synthesis** The coast of Yellow Sea and Bohai Gulf contains the world's largest continuous mudflat seashore. Sediments and nutrients are continuously discharged from the Yellow River and Yangtze River (two of the ten world longest rivers) and other rivers including Yalu River, Liao River, Luan River and Hai River, and form fertile mudflats, radial sand ridges and sandbanksas well as sand dunes, lagoons, rocky shores, and islands where threatened birds aggregate to breed. Nowadays, the dynamic process of river sediment discharge

	and tectonic subsidence continue to shape wetland landscape and ecosystem on the Bohai Gulf-Yellow Sea coast, making it one of the most diverse and fertile coasts in the world, providing key sanctuaries for migratory birds on the East Asian-Australasian Flyway. The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a serial world natural heritage nominated property consisting of natural wetland habitats such as deltas, sandbanks, mudflats, saltwater/freshwater swamps, rocky shores, islands and ancient coastlines, as well as salt pans, fish ponds and rice paddies. The serial nominated property range from Northeast China to East China, providing key stopovers, wintering grounds or breeding grounds for threatened migratory bird species, constituting one of the world's most diverse and magnificent temperate coastal sanctuaries and ecosystems, and an indispensable part of the global biodiversity conservation. Some of the species are the world's most noticed threatened birds, including two critically endangered water birds: the Chinese crested-tern (*Thalasseus bernsteini*) with the global population just more than a hundred, the spoon-billed sandpiper (*Eurynorhynchus pygmeus*), with only hundreds of individuals left in the world. Almost all individuals of the Nordmann's greenshank (*Tringa guttifer*), the great knot (*Calidris tenuirostris*), and the Far Eastern curlew (*Numenius madagascariensis*) depend on these habitats. The East Asian-Australasian Flyway Partnership assessed the importance of 1030 key wetlands on the flyway. The results showed that the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast, and are thus suitable for the first phase of the nominated property. The serial nominated property Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) consists

	of two components: 1) Jiangsu Dafeng National Nature Reserve, and the southern section and the Dongsha experimental zone of Jiangsu Yancheng National Nature Reserve (YS-1) in Jiangsu Province, southwest Yellow Sea coast; and 2) the middle section of Jiangsu Yancheng National Nature Reserve (YS-2). The two components are separated by the Dafeng Port and the surrounding areas with dense human activity, with their boundaries about 30 kilometers apart. **Jiangsu Dafeng National Nature Reserve, and the southern section and the Dongsha experimental zone of Yancheng National Nature Reserve (YS-1).** The component covers an area of nominated property 109,370 ha, plus a buffer zone of 23,188 ha on the west. Dafeng contains typical habitat types of secondary forest on marine deposition plain and freshwater reed marsh. The southern section of Yancheng Reserve and Dongsha embody the complete ecosystems of intertidal mudflats, radial sand banks and sand ridges. Dafeng is home to the world's largest captive population and largest reintroduced population of Père David's deer (or milu, *Elaphurus davidianus*). The southern section of Yancheng Reserve and Dongsha provide an important stopover site for the waders on the East Asian-Australasian Flyway. Half of the world's spoon-billed sandpipers and Nordmann's greenshanks make long stopovers, feed, or even moult in the nominated site and surrounding areas. **The middle section of Jiangsu Yancheng National Nature Reserve (YS-2).** This component is located in Sheyang County, Tinghu District, Yancheng, Jiangsu, containing the core area in the middle section of Jiangsu Yancheng National Nature Reserve. The area of the nominated property is 43,804 ha, plus a buffer zone of 51,785 ha on the west. The middle part of Yancheng Reserve mainly consist of habitat types of freshwater reed marsh and intertidal mudflat. It provides the most important wintering ground for the migratory population of red-crowned crane (*Grus japonensis*), with

about 50% (in some years 80%) of individuals spending the winter here each year.

The area involved in the two nominated properties above constitutes the largest intertidal flat on the west bank of Pacific Ocean. Within the two nominated properties, large tracts of coastal habitats remain less disturbed by human activity, retaining the natural ecosystem structure and functions, becoming one of the natural coastlines rare in this country and the world. The main body of the marine deposition plain and mudflat is formed before 1855, when Yellow River changing its course back to the north. Nowadays, the intertidal mudflat is still mainly in the process of accumulation under the special marine hydrological processes. The above process has shaped the crucial habitat for threatened species such as the red-crowned crane, the spoon-billed sandpiper and the Nordmann's greenshank in the serial nomination properties (Phase I). These habitats, together with other sites along the Chinese coast to be nominated in the future, form indispensable links in the conservation network for more than 20 threatened bird species on the East Asian-Australasian Flyway.

b) Justification for criteria

Criterion (ix): Since the Pleistocene, great rivers such as the Yellow River and the Yangtze River have been endlessly flowing into the Yellow Sea and the Bohai Gulf, carrying massive material from the Qinghai-Tibet Plateau and the Central Asian desert. On the other hand, the continental shelf in Yellow Sea and Bohai Gulf have been in the process of continuous subsidence. Accumulation of river sediment discharge and tectonic subsidence, combined with marine hydrological processes and climate change, have jointly shaped the natural landscape along the Yellow Sea and Bohai Gulf coast, forming the basis for the occurrence and evolution of ecosystems.

	The sites for the first phase of serial nomination have long been under the influence of the Yangtze River, the largest river in Asia. Between A.D. 1194 and 1855, the Yellow River, with the largest known sand discharge, used to enter the sea near the nominated properties. The nominated properties are located in a region where the river (terrestrial) and marine ecosystems interact intensely, probably the most typical of its type in modern times. A large amount of river sediment discharge interacts with the ocean current to form intertidal mudflats and unique radial sand ridges. During the sea transgression and regression since the late Pleistocene, the sediments discharged from the ancient Yangtze River estuary and Huai River estuary have accumulated to form more than 30,000 km^2 of radial sand ridges centered at Jianggang, under the influence of special radial flow in the coastal waters of Yellow Sea. Radial sand ridges, sand banks and tidal channels constitute the largest part of the nominated site YS-1. Radial sand ridges have always been changing under the intense influence of tidal currents and storms, but the general trend is to merge and expand, and to move toward the shore. Sand banks in the middle of the radial structure or close to the shore are mostly accumulating and growing. The dynamic changes of these landscapes driven by changes of river and marine hydrology and climate have become the major driving forces of the evolution of ecosystems and even species. It is in order to feed on the diverse benthic animals living in such dynamically changing habitats that the waders here undergo adaptive divergent evolution. The coastal area within the YS-2 nominated area is mainly plains formed by marine deposition. Due to the tidal asymmetry (fast flood tides and slow ebb tides), the sediments transported by tides can be accumulated in the intertidal zone. This is an important driving force for the formation of the plains. Large rivers discharge into the

	southern Yellow Sea a large amount of sediments, which are then suspended and transported by tides and waves to be deposited in the intertidal zone. Meanwhile, the coastal plain continuously silts up, advancing to the sea, forming unique intertidal mudflats. The vegetation zones in the nominated area shows remarkable characteristics of coastal wetland vegetation: with changes of soil salinity and seawater submergence, the vegetation structure in the nominated area shows obvious transition and clear succession. From the sea side to the land side, the transition types are: mudflat with no vegetation, *Spartina alterniflora* marsh, *Suaeda glauca* marsh, *Aeluropus sinensis* grassland, *Imperata cylindrical* grassland or reed marsh. On the most salty mudflats with no vegetation live the most abundant benthic animals, which provide rich food resources for migrating birds. On the land side of the mudflats, *Spartina alterniflora* communities exist in some areas. Further toward the land side grow salt-tolerant plants, such as *Suaeda glauca* and *Salicornia europaea*. In the areas with salinity as low as 0.6% -1.0%, the amount of *Aeluropus sinensis* increases in the *Suaeda glauca* community. The type of vegetation that appears furthest toward the land side is *Imperata cylindrical* grassland, often accompanied by *Setaria viridis*, *Artemisia capillaris*, reeds *Phragmites communis*, *Zoysia macrostachya* and other plants. In addition, large reed communities distribute in water-rich areas, such as lower mudflats and the estuarine zone. These areas often used by birds such as red-crowned cranes. The spatial distribution of habitat types and vegetation communities change with the dynamic changes of the muddy shore, forming the basis for the maintenance of biodiversity. These two nominated properties not only represent the typical characteristics of the coastal and marine ecosystems and their changes in landscape pattern, but also highlight the evolution of their plant communities against the background of the dynamic changes in

	coastal landscape. At the same time, their ecosystem supporting services also fully reflect the ecological and physiological processes in various organisms related to adaptation and evolution, making the area an outstanding example of coastal and marine ecosystems. **Criterion (x):** The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China concentrates threatened bird species and their habitats of global concern, and has outstanding value in conservation and scientific research. These areas are located on the East Asian-Australasian Flyway, where the number of threatened waterbird species is much higher than the other seven major flyways in the world. Moreover, the first phase of the serial nomination involves the flyway's highest-rated reserve and key habitat for threatened birds. The nominated properties involve Jiangsu Dafeng National Nature Reserve and Jiangsu Yancheng National Nature Reserve, both located in the south of Yellow Sea Ecoregion (#203 in the WWF Global 200 Ecoregions), containing the world's largest continuous mudflat seashore, already listed as important wetlands in the Ramsar Convention. As one of the best preserved intertidal mudflats, Jiangsu Yancheng National Nature Reserve has joined UNESCO's Man and Biosphere reserves network. The area features rich biodiversity, providing key stopovers, breeding grounds and wintering grounds for millions of migrating waterbirds on the East Asian-Australasian Flyway. Jiangsu Dafeng National Nature Reserve, and the southern section and the Dongsha experimental zone of Yancheng National Nature Reserve (YS-1) is located in the central keynode range of East Asian-Australasian Flyway, 7000 kilometers apart from both the breeding and wintering grounds of waders, and thus serves as an indispensable stopover and "gas station". For waders, Dafeng and Dongsha and the vast surrounding area is the largest and the most

	important stopover on this flyway. It is estimated that at least two million waders use the area during their northward migration, accounting for more than 40% of the migratory waders on the flyway. There are also massive waders – at least a million – passing the area during the southward migration. The radial sand ridges and surrounding areas where Dongsha is located are the autumn stopover and moulting ground for more than 50% of spoon-billed sand pipers, a globally critically endangered species. In addition, Dafeng is currently home to more than two-thirds of the global population of wild Père David's deer, providing a model for reintroduction and rewilding of large mammals after extinction in the wild. The middle section of Jiangsu Yancheng National Nature Reserve (YS-2) is an important habitat for the critically endangered species Baer's pochard (*Aythya baeri*) and Siberian white crane (*Leucogeranus leucogeranus*). It is also the most important wintering ground for the endangered species red-crowned crane (*Grus japonensis*), with the wintering population accounting for more than 40% - 55% of the species' migratory population. Meanwhile, the nominated property is also a stopover site for about 10% of the population of the endangered species black-faced spoonbill (*Platalea minor*), and one of the important breeding and wintering grounds for the vulnerable species Saunders's gull (*Larus saundersi*). **c) Statement of integrity** The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China involve large tracts of mudflats, beaches and other habitats connected to them through the migration of birds, consisting the largest coastal migratory bird habitat system, serving as key stopovers for bird migration between the two hemispheres and an important part of the East Asian-Australasian Flyway. The vast space

	provide high quality rest stops for more than a hundred species and millions individuals of migratory waterbirds, to replenish the fat they need for the continued flight. The phase I of the serial nominated property includes all the intertidal wetlands undisturbed by human activity, including two existing nature reserves, especially the radial sand ridges covered by the reserves. The nominated properties adequately reflect and protect all kinds of natural, dynamic elements of the intertidal wetlands. The area presents a coherent landscape spectrum, from wetlands on the land side to radial sand ridges, showing comprehensively the evolution of landforms and habitats related to tidal processes. Yancheng wetlands on the Yellow Sea coast feature unique, complete intertidal mudflats in fresh water, brackish water and salt water zones. The nominated property (Phase I) and buffer zone of more than 220,000 hectares will ensure the continuity of ecological functions, and the ecological processes in the intertidal zone can happen without restriction. Sufficient area, high quality mudflats and undisturbed natural ecosystems provide good stopovers and ample space for migratory birds. Among them, YS-1 contains sandbanks, sand ridges, tidal channels and sea areas located in radial sand ridges, providing an important feeding ground for waders during low tides. The area also contains a series of habitat types from coastal mudflats to inland wetlands, providing resting areas for waders during high tides. The inland section includes the main range of Père David's deers and their all suitable types of habitats. YS-2 is the area with the highest concentration of red-crowned cranes, as well as a habitat favoured by other cranes, geese and ducks. The current nominated area contains all high quality habitats and all types of feeding and resting habitats for red-crowned cranes.

	At present, the nominated properties (Phase I) and buffer zones are located within Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve, both strictly protected by the laws of China. The official Ecological Red Lines also provide adequate protection. These management and protection policies can ensure that the region remains undisturbed, maintaining intact ecosystems and ecological processes. The nominated property (Phase I) include the core areas and intertidal wetlands in the two reserves, as well as the Dongsha district, while the buffer zones and experimental zones of the two reserves surround the west side (land side) of the nominated property, providing adequate buffer and protection from the inland direction. At the same time, the ongoing sustainable management of farmland, fish ponds and salt pans in the buffer zone also provided a space for the diffusion and movement of threatened species such as the red-crowned crane and the Père David's deer. **d) Requirements for protection and management** The nominated property is state-owned, with the status of national nature reserves. A multi-level management system has been established from the state to the local areas, forming a mechanism for collaborative protection between government agencies and communities, social organizations and research institutes, with staff and funding guaranteed. Under the strict protection by the laws and regulations of the country and the local government, the natural status of coastal intertidal wetlands has been effectively maintained through the cooperation between government agencies, communities and social organizations, ensuring the survival and reproduction of the species, providing stopovers for migratory birds. At both national and provincial levels, the government has paid great attention to the protection and management of World Natural Heritage sites. The

	Outline for the *13th Five-Year Plan of Jiangsu Province* clearly states, "we will support the Dafeng and Yancheng Nature Reserves to be nominated for the inscription on the World Natural Heritage List, and ensure that the ecological diversity of the key regional watershed improves steadily." In the future, we will continue to strengthen the protection and management of the nominated properties in the following aspects: 1) Strengthen the monitoring and research of the elements with natural heritage values, including landscapes and biological elements, in order to implement adaptive management. 2) Monitor and study the threats, and carry out targeted prevention, control or remediation measures; 3) involving enterprises and residents in the nominated properties and buffer zones in the management, monitoring and public education actions, and continue to promote public participation and concern in the protection work; 4) improve the interpretation system, control the number of tourists and enhance the ecological education for tourists; regulate access to tourist areas, strengthen supervision and keep the impact of tourism and transportation on the minimal level; 5) establish a unified administration office to lead the management of the nominated properties and buffer zones (Yancheng Municipal People's Government of Jiangsu Province has approved the establishment of World Heritage Application and Management Office Yancheng Municipality); 6) enhance the protection and management of the nominated properties and buffer zones by integrating the administrative forces of the two nature reserves; 7) use the technical support from the expert group for Yancheng World Heritage nomination, local authorities, monitoring and research institutions, and universities, who will be responsible for the monitoring, protection and management of the nominated properties; 8) promote local legislation to protect the nominated properties and formulate the

	"Regulations for the Protection of Yancheng's World Heritage Nominated Property”.
Name and contact information of official local institution /agency	Organization: Ministry of Housing and Urban-Rural Development, the People’s Republic of China Address: 9 Sanlihe Road, Beijing, China Zip code: 100835 Tel: +86-10-58934062 E-mail: lionkinglzp@163.com Web address: http://www.mohurd.gov.cn/ Organization: Jiangsu Provincial Department of Housing and Urban-Rural Development Address: 88 Caochangmen Avenue, Gulou District, Nanjing, Jiangsu, China Zip code: 210036 Tel: +86-25-51868531 E-mail: 136894378@qq.com Web address: http://jsszfhcxjst.jiangsu.gov.cn/ Organization: World Heritage Application and Management Office Yancheng Municipality Address: 11F SDIC Business Building, Xindu Subdistrict, Yandu District, Yancheng, Jiangsu, China

	Zip code: 224000 Tel: +86-515-88200578 E-mail: 1140936110@qq.com Organization: Jiangsu Yancheng National Nature Reserve Administration Address: 8 Wanghe Road, Xinyang Port, Huangjian Town, Tinghu District, Yancheng, Jiangsu, China Zip code: 224057 Tel: +86-515-82642202 E-mail: yczqbhq@126.com Web address: http://www.yczrbhq.com/ Organization: Jiangsu Dafeng National Nature Reserve Administration Address:Milu Reserve, Caomiao Town, Dafeng District, Yancheng, Jiangsu Zip code : 224136 Tel: +86-515-832393017 E-mail: milu832393017@163.com Web address: www.chinamlw.org

Location of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in China

YS-1: Beidaihe National Nature Reserve, and the Southern Section and Changli Experimental Zone in Beidaihe National Nature Reserve
YS-2: The Middle Section of Jiangsu Yancheng National Nature Reserve

Location of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in Jiangsu Province

Detailed Map of Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve(YS-1)

Detailed Map of the Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2)

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1. Identification of the Property

1.a Country

People's Republic of China

1.b State, Province or Region

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) World Natural Heritage Nominated Properties are located in several counties (districts) in Yancheng Municipality, Jiangsu Province, China as below:

Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1, short for Yellow Sea-1): Sheyang County, Tinghu District, and Dafeng District

The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2, short for Yellow Sea-2): Dafeng District, Dongtai City and Dongsha

1.c Name of Property

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

1.d Geographical coordinates to the nearest second

Table 1-1 Coordinates of the nominated property of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

ID No.	Name of the Component Part	Coordinates of the Central Point
YS-1	Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng	N 33°0′16.14″ E 121°3′29.92″

	National Nature Reserve (YS-1)	
YS-2	The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2)	N 33°34′8.54″ E 120°39′1.60″

1.e Maps and plans, showing the boundaries of the nominated property and buffer zone

Figure 1-1 Location of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in China

Figure 1-2 Location of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in Jiangsu Province

Figure 1-3 Detailed Map of Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1)

Figure 1-4 Satellite image of Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1)

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Figure 1-7 Map Showing Relationship of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) to the Existing Protected Areas

1.f Area of nominated property (ha.) and proposed buffer zone (ha.)

The total area of the two component parts of Nominated Migratory Bird

Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) is 228,147 hectares, comprising nominated property and buffer zones of 153,174 hectares and 74,973 hectares respectively.

Table 1-2 Area of nominated properties and proposed buffer zones

ID No.	Name of the Component Part	Area of the Nominated Property (ha.)	Area of the buffer Zone (ha)	Map N°
YS-1	Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1)	109,370	23,188	Figure 1-3, Figure 1-4
YS-2	The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2)	43,804	51,785	Figure 1-5, Figure 1-6
Total area (in hectares)		153,174	74,973	

Figure 1-1 Location of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in China

Figure 1-2 Location of the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) in Jiangsu Province

Figure 1-3 Detailed Map of Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1)

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2. Description

2.a Description of Property

2.a-1 The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

2.a-1-1 Overall introduction

Migratory Bird Sanctuaries of the Yellow Sea and Bohai Gulf of China are located in the Yellow Sea Ecoregion, which includes the largest inter-tidal flats in the world, and the key habitats in the East Asia- Australasian Flyway.

Fig. 2-1 Map of the WWF Global Ecoregions, and location of the Yellow Sea Ecoregion (shown as red rectangle; Cited from WWF)

The Yellow Sea Ecoregion includes the Yellow Sea, the Bohai Gulf and part of the East Sea, and is located at the transaction zone between Asian Continental and Pacific Ocean. It has been listed as one of the Global Ecoregion 200 by WWF (World Wide Fund for Nature). Its southern boundary lies between Yangtze River estuary of China, and Jeju Island, and Nakdong River Estuary of South Korea. And northern boundary are the coast lines of

both Yellow Sea and Bohai Sea, with the coordinates of N31°40′-N41°00′, E117°35’ -E126°50’. Of which, the Chinese coast lines started from Yalu River Estuary, through Liaoning Province, Hebei Province, Tianjin Municipality, Shandong Province, Jiangsu Province and Shanghai Municipality, with the coastal line length of 6500 km. The total area of the Yellow Sea Ecoregion is 458 million hectares.

The tidal flats of the Yellow Sea Ecoregion are key habitats for millions of migratory water birds of the East Asia Australasia Flyway, which provide stopover sites, wintering grounds and breeding grounds for the migratory water birds. It is estimated that at least 2 million shore birds use the area during the spring (northward) migration, and at least 1 million shore birds use the area during the autumn (southward) migration (Barter 2002: viii). Moreover, the number of threatened species along this flyway is far more than any of the other 7 flyways.

The landscapes and ecological processes along the Yellow Sea-Bohai Gulf coast are shaped by two interacting processes: accumulation of the sediment discharge from rivers in east China, and subsidence of the East Asian continental shelf. Large rivers such as the Yellow River, the Yangtze River and the Huai River, meandering over vast alluvial plain, bring fertile silt and muddy water into the shallow basin of the Yellow Sea. The natural process of sea level change and subsidence has formed the world's largest intertidal mudflats.

Fig. 2-2 Map of Yellow Sea Ecoregion, showing national boundaries, major cities and rivers (Cited from *Shorebirds of the Yellow Sea*)

Migratory Bird Sanctuaries of the Yellow Sea and Bohai Gulf of China is a serial world heritage nomination. 16 sites along the coast of the Yellow Sea and Bohai Gulf will be nominated in 3 phases. The detailed plan and introduction to each site is explained in preface. This document only elaborates Phase I of the serial nomination: Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1), and the Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2).

Fig. 2-3 Location of the Yellow Sea Ecoregion in the East Asia-Australasia Flyway, Yancheng tidal flats are shown as unique radial sand ridges extend to 3 million ha (Cited from *Invisible connections. Why migrating shorebirds need the Yellow Sea*.)

2.a-1-2 The status of the nomination of the world heritage in the the Yellow Sea Ecoregion

Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China are located in the Yellow Sea ecoregion, which attracts massive attention from the global conservation community. The IUCN World Conservation Congress (Jeju, Korea 2012) unanimously agreed on the “conservation of the East Asian-Australasian Flyway and its threatened waterbirds, with particular reference to the Yellow Sea” (Resolution 5.028), highlighting the global importance of the Yellow Sea. Four years later, the IUCN World Conservation Congress (Hawaii, U. S. 2016) again adopted a resolution on the “conservation of intertidal habitats and migratory waterbirds

of the East Asian-Australasian Flyway, especially the Yellow Sea, in a global context" (Resolution 6.026), recognising the outstanding universal value of the Yellow Sea region. The resolution also suggested to consider the possibility of World Heritage nomination for the intertidal zone of Yellow Sea, to promote its protection and sustainable development.

Republic of Korea submitted to the tentative list of "Southwest ern Coasts Tidal Flats" to the World Heritage Center of UNESCO in 2010, which includes 6 nominated sites: Gochang, Suncheon, Muan, Buan, Boseong, and Sinan. The dynamic of these tidal flats from muddy to sandy driven by monsoon is a prominent feature of global significance. The tidal flats is also key stopovers for about 1,000,000 migratory birds of 300 species, and important breeding sites for threatened species like black-faced spoonbill (*Platalea minor*).

In February 2017, China submitted to the tentative list for World Natural Heritage "The Coast of the Bohai Gulf and the Yellow Sea of China", which covered fourteen key migratory bird sanctuaries scattered in the 6,500 km long coast from Yalujiang Estuary to Yangtze Estuary. The Coast of the Bohai Gulf and the Yellow Sea of China is modelled by the sedimentation of great rivers, like Yellow River, Yangtze River, Yalu River, Liao River, Luan River, Hai River, and continental shelf settlement, during different eras. The large, continuous mudflats and radial sand ridges are unique marine hydrological structures of global significance. These sites are also important stopovers, wintering ground and breeding sites for the most threatened species in the flyway, which attract the attention all over the world.

Fig. 2-4 The nominated properties in the Yellow Sea Ecoregion

There is global significance in the Yellow Sea Ecoregion surrounded by China, Democratic People's Republic of Korea, and Republic of Korea. Compared with other World Heritage sites, there are irreplaceable outstanding values and differences in geography, ecology, biodiversity, as well as conservation and science (for more details see 3.2).

2.a-1-3 The significance of the nominated property among the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China

The nominated properties, Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I), are located in Yancheng where distributes the largest continuous intertidal mudflats of the world, as well as the unique radial submarine sand ridges system. The region is also the most important key stopover for migratory birds in the Yellow Sea Ecoregion. It is estimated that over 40 % water birds in the East Asia-Australasian Flyway use the nominated properties. According to the assessment by East Asia-Australsia Flyway Partnership, the nominated properties ranks top three, out of 1031 key wetlands across the whole flyway, and it gets the highest scores among all sites within Yellow Sea Bohai Gulf costal wetlands. Therefore, It is the optimal and inevitable choice to start the serial nomination from Yancheng, and necessary solutions for the conservation of key migratory birds' sanctuaries and the most characteristic marine hydrodynamic landscape as well as relevant ecosystems.

2.a-2 Introduction to the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

2.a-2-1 Natural geography

2.a-2-1-1 Geographic location

The nominated property is situated in the southwestern part of the Yellow Sea Ecoregion. It contains two component parts: Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1) and
The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2).

YS-1

YS-1 ranges from N 33°17′24″ to N 33°49′10″, from E 120°23′52″ to E 120°48′18″, and the central coordinate is N 33°33′17″, E 120°36′05″. The main part of YS-1 is within the range of Jiangsu Dafeng National Nature Reserve and the experimental zone of Jiangsu Yancheng National Nature Reserve. The north boundary starts from Zhugangzha, extends towards east to the north boundary of Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve. The west boundary starts from Zhugangzha, extends towards south along the boundary of reclamation area to Chuandonggang, turns west for 2.18 km, turns southwest to Dongchuan sea dyke, extends along the Chuanxin Road for 2.75 km, reaches the north boundary of reclamation area and turns to south to the north boundary of Tiaozini reclamation area. The south boundary starts from Liangduozha, extends towards east along the planned Tiaozini embankment to the south boundary of Dongsha Experimental Zone. The east boundary coincides with the east boundary of Dongsha Experiment Zone.

The buffer zone is mainly located on the west (land side) of nominated property. The north boundary starts from the intersection of Zhugangzha and G228, extends towards east along the river to Zhugangzha. The west boundary starts from the intersection of Zhugangzha and G228, extends towards south along the sea dyke across the river of Dongchuangang, turns west for 2.8 km, turns southeast along X202 road to the boundary of Jiangsu Dafeng National Nature Reserve. From this point, the west boundary extends towards south and ends at the crossroad of G228 and X302. The south boundary starts from the north side of X302 road, extends towards east, extends across Liangduohezha to the -3m isobath. The east boundary starts

from where Zhugangzha enters the sea, extends towards south, extends along the boundary of reclamation area to Chuanxin Road, turns west for 2.18 km and then turns southwest to Dongchuan sea dyke. Starting from this point, the east boundary turns towards southeast along Chuanxin Road, then turns south to the north boundary of reclamation area and then turns east for 2.75 km, turns south and reaches the north boundary of Tiaozini reclamation area.

YS-2

YS-1 ranges from N 32°49′02″ to N 33°11′30″, from E 120°43′32″ to E 121°18′10″, and the central coordinate is N 33°33′17″, E 120°36′05″. YS-2 is located within Jiangsu Yancheng National Nature Reserve.

The North boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards east for 5 km. The west boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards southeast along the boundary of reclamation area to Xinyanggang estuary and reaches the north boundary of the core area of Jiangsu Yancheng National Nature Reserve. From the south bank of Xinyang Harbor, the west boundary extends 1943 m southwards, turns towards 405 m east of the sea dyke, extends southwards parallel to the sea dyke until the boundary of Dafeng County, extends 100 m southwards to the north bank of Doulong Harbor, then eastwards along the bank until the -3m isobath, and turns southward towards the parallel line 3 km south of the eastward extension of Simaoyou River. The south boundary is the parallel line 3 km south of the eastward extension of Simaoyou River, extending eastwards until 5km offshore. The east boundary is the -3m isobath, which marks the boundary of intertidal zone.

On the east of the nominated property lies subtidal mudflat, where there is no fixed artificial facility. Due to the extremely complicated hydrological condition

and unstable radial sand ridges morphology, the mudflat is very dangerous for small boats, and does not allow large ships to approach, so it is not necessary to establish a buffer zone on the east side. The buffer zone is mainly located on the west (land side) of nominated property. The north boundary starts from Huangshagang, extends towards east, turns northeast along the north boundary of the middle section of Jiangsu Yancheng National Nature Reserve to 1.7 km south from Sheyang river estuary. The west boundary starts from Huangshagang, extends southeast along the east side of Huanghuang road, turns south, extends across Xinyanggang along the east side of S331, turns southwest at Zhonglugang, turns south along the Xichao river, turns southeast at Fangqiang Farm along the river, turns east at Dongfanghongqizu, reaches sea dyke road at Doulonggang, turns south to Sanmaoyou river along sea dyke road and G228. The south boundary starts at Sanmaoyou river, extends eastwards to sea dyke road, and extends northwards along the road to the line 3 km south, parallel to eastward extension of Simaoyou River, and reaches the -3m isobath. The east boundary coincides with the west boundary of the nominated property.

Existing protected areas

Fig. 2-5 The geographical locations of the nominated property, in relation to the two existing protected areas: Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve

Key conservation objects of Jiangsu Yancheng National Nature Reserve include coastal wetland ecosystems, and red-crowned cranes, spoon-billed sandpiper as well as other rare and endangered migratory water birds. It is the largest coastal wetland nature reserve in China, with the coastal line length of 582 km. Major wetland types include permanent shallow sea, tidal flats, salt marshes and artificial wetlands. It was designated as Ramsar site in 2002, under criteria 2, 3, 4, 5, 6 and 7. The site has unique bio-geographic fauna and flora of global importance. Therefore, it was designated as nature reserve of provincial level in 1983, then been promoted as national nature reserve in 1992, and became as one of the network sites of MAB in the same year; a few years late, it was accepted as one of the northeast Asia crane conservation network site in 1996. In 2002, it was designated as Ramsar Site.

Biodiversity inventory recorded great number of biological species, including 415 species of birds, 47 species of mammals, 30 species of amphibians and reptiles, 199 species of fishes, 86 species of zoo plankton and 498 species of insects, of which 94 species are national key protected species, including 13 first class national protected species, and 81 species of second class national protected species. At least 34 species are threatened species of the IUCN red list, including critically endangered Spoon billed Sandpiper (*Eurynorhynchus pygmeus*), Baer's Pochard (*Aythya baeri*), and Siberian cranes (*Leucogeranus leucogeranus*), and global endangered species Red-crowned Crane (*Grus japonensis*), Oriental White Stork (*Ciconia boyciana*)、Scaly-sided Merganser (*Mergus squamatus*)、Great Knot (*Calidris tenuirostris*)、Far-eastern Curlew (*Numenius madagascariensis)*. It supports the largest wintering migratory population of red-crowned cranes (*Grus japonensis*), with

600-800 individuals wintering here, which accounts for 40-55% of the global migratory population (the highest record of 1200 individuals, accounts for 80% of the global population). Over 3 million shore birds pass through and stop here for 5 to 6 weeks every year, and the number of wintering birds range from 100,000 to 300,000 since 1990s.

Moreover, 285 species of vascular plants have been recorded in the nature reserve, including 5 species of national protected, and formed comprehensive vegetation along the ecological gradients.

Jiangsu Dafeng National Nature Reserve is dedicated for the re-introduction of the deer, and it is adjacent to Yancheng National Nature Reserve. Major objective it to conserve the habitat for the re-introduction of the Pere David's deer. It was designated as the Ramsar site in 2002 due to its importance in supporting threatened species and biological communities (Ramsar Criterion 2). Similar to Yancheng National Nature Reserve, it was designated as provincial nature reserve in 1986, and then promoted as national nature reserve in 1997. In 2002, it was designated as one of the Ramsar Wetland Sites.

Biodiversity inventory recorded 204 species of birds, 150 species of fishes, 27 species of mammals, 21 species of amphibian and reptiles and 80 species of insects. Among which 31 species are on the list of national protected species. Pere David's Deer is the dominate mammal species, which grown from 39 individuals that were introduced from UK in 1986, and now the population has been grown up to 4101, which is a species listed as extinct in the wild by IUCN. However, with the effort of the nature reserve, this species has not only expanded its populations, but also re-introduced into the wild habitat,and the wild population has also grown to 846 individuals. Besides, the nature reserve

has also recorded 170 red-crown cranes and 50,000 of other wintering water birds.

Jiangsu Dafeng National Nature Reserve recorded 227 species of vascular plants that belongs to 159 genera and 53 families. The tidal flats are featured with forests, vegetated tidal flats. Key vegetation types include salt meadows, marsh vegetation, submerged plants, shrubs and deciduous forests.

2.a-2-1-2 Geology and topography

YS-1 and YS-2 are less than 30km apart, with similar conditions of geology, topography, climate, hydrology and soils. So these aspects will be introduced as a whole in the following paragraphs.

(1) Geological structure

The tectonic structure where Jiangsu coast is located on Huabei (North China) platform and Yangtze quasi-platform, approximately with near northeast Huaiyin-Xiangshuikou fault as boundary. Since the Tertiary, Huabei Platform mainly have showed rise of fault block, developing a series of NE-SW direction faults. Since Mesozoic Southern, Yangtze quasi-platform have mainly showed sedimentation process, developing a whole set of platform type stratum mainly made up of marine carbonate and clasolite from the Sinian system to Triassic system, and forming a large scale continental deposit basin on the basis of Indosinian-Yanshan folding, namely the Subei-South Yellow Sea basin. The heritage nominations mainly locate Subei geotectogene to the north of Tangzte quasi-platform. Over long geographic period, the geotecogene develops slowly from west to east, to south Yellow Sea, with range of subsidence increasing from west to east. Different range of subsidence everywhere forms a series of geotecogene and uplift, among then

Dongtai geotecogene is the deepest and largest.

The framework of geographic structure in Subei-South Yellow Sea is controlled by NNE and WNW fault groups, the next are NE, NW. Some are large scale deep major fracture which controlled sedimentation since Late Tertiary, which also became the boundary line of new structure and topography in the region. The Quaternary neotectonics has the nature of blocking elevating and sinking. Jiangsu coastline is roughly NW direction, controlled by NW major fault and South Yellow Sea major fault.

Fig. 2-6 Distribution of fracture in Jiangsu

(2) Characteristics of stratum

Except Archeozoic stratum at Shiqiao, Qinshan Island of Ganyu and Proterozoic stratum at Houyuntai Mountain, east, west Liandao, other regions of Jiangsu are almost covered by quaternary sediment, Cenozoic stratum

develops completely, with total thickness up to 3,500 m. Thickness of stratum varies with position of geographic structure, typically thicker at deep sag and thinner at convex location. The thickness of coast at Sheyang, Dafeng and Dongtai are the thickest and up to 300 - 400m. The stratum of abandoned delta of Yellow River and the middle coastal marine deposition plain of the heritage nomination locates features as follows:

Abandoned delta of Yellow River is mainly the delta deposit formed when Yellow River seized the estuary from Huai River, which is Holocene series (Q_4) deposition made from gray-yellow silty clay and silty clay. The clay texture is very homogeneous, and the particles are very fine, free of the coarse particles such as silty sand and fine sand. It has the characteristics of sediment in the mud bay. The clay includes two layers: upper layer is solidified because of exposure to the earth surface and long term evaporation; lower layer is ooze, still in semi-plastic state. At its bottom shall be estuary deposition of ancient Huai River.

Fig. 2-7 Change of Yellow River Bed for the past 2000 years

Middle coastal marine deposition plain develops towards the sea in the mode of sand reef-lagoon, with marine and lagoon deposition widely distributed. Ancient seashore sand levee and ancient lagoon extend in south-north direction, distribute and rank alternately in east-west direction, develop towards the sea parallel to modern coast. The thickness of Holocene series (Q_4) deposit is 10 – 40 m. Its upper section distributes at the line of Zhongshan River to Pincha-Xiaoyangkou, being grey yellow clayey silt; middle section is gray, gray black sub-clay, mainly containing silty sand, mixed with ooze or fine sand, being shallow sea-coastal deposition formed under warm and hot environment and large scale transgression; lower section is dark gray clay, silty sand and sandy loam, belonging to lagoon estuary deposition. Depth of upper Pleistocene series (Q_3) deposit is 15 – 70 m, thickness is 15 –

80 m. From the north of Sancang River in Dongtai City to Guanhe estuary, upper layers are dark gray loam, sandy loam, silty and fine sand, lower layers are dark gray silty and fine sand, alteration of loam and sandy loam. In the south of Sancang River, upper layers are versicolor loam mixed with gray silty and fine sand, coarse sand of ancient gravel, lower layers are slate gray, grayish brown, green yellow loam and gray silty, fine sand, and coarse sand containing gravel, middle layers are mainly gray silty, fine sand, sandy loam. Depth of middle Pleistocene series (Q_2) deposit layer is 40 - 160m, thickness is 30 - 150m. From the south of main Subei irrigation channel to the north of Shuangyanggang line, the majority is brown yellow loam, mixed with gray silty, fine sand; from Shuangyanggang to Fangqiang town, dark gray loam, clay and ooze type loam are mixed with yellow medium, fine sand layer; from Fangqiang town to Dongtai River, there are grey silty clay and sandy loam, alteration of powder and sand; from the south of Gongtai River to Tongyuan Haimen City-Sanjia Qidong, upper section are gray fine, medium sand and medium, coarse sand containing gravel, mixed with loam layer, lower section are brown yellow, grayish green clay, alteration of loam and gray silty, fine sand.

Radial sand ridges in Jiangsu coast are located in Subei-South Yellow Sea depression zone. Strong Mesozoic, Cenozoic tectonic movement formed large scale sedimentary basin, with thick Mesozoic, Cenozoic deposit. A set of limestone and mud stone deposited in Paleozoic and Triassic; Indosinian movement in late Triassic makes Subei-South Yellow Sea depression a northeast trumpet-like basin, grayish green sandy mudstone and argillaceous sandstone deposited in Jurassic, in cretaceous red clastic stone, purple sandstone and sandy mudstone deposited; in Cenozoic Himalayan movement

sank the depression zone dramatically, forming 2,000m thick gray, brown sandstone and mudstone, versicolor mudstone intercalated with sandstone.

(3) Geomorphic characteristics

Geomorphic types of the nominated properties include coastal marine deposition plain and radial sand ridges intertidal belt shoal wetland.

Coastal marine deposition plain, extended to the east of Chuanchang River, distributed from the north from Sheyang riverside at southern edge of Huanghuai delta, to the south to northern edge of Yangtze River delta, about 50km wide. It is a long and narrow vast marine deposition plain formed through constant expending for nearly one thousand years. The plain was submerged as shallow sea by the last transgression of Quaternary. To the sand levee outside east bank of Lixia River Plain, it became land successively. The young plain just formed 2,000 - 3,000 years ago is still constantly expanding towards the sea, which is indicated mainly by continued eastward advancement of seashore at Dafeng, and formation of a large scale radial sand ridges in the east of Luegang. Altitude of the ground of coastal plain is between 1.5 m and 4.5 m, slowly declining from southeast to northwest. Hai’an, Dingyan Rugao city, Rudong region is the joint of sand spit at north bank of Yangtze River and coastal plain, is the highest. From here toward north, its relief lowers gradually to about 1m at Sheyang riverside. East coastline of the coastal plain is straight, there is vast tidal beach and radial sand ridges outside coast. Due to low relief, all rivers entering the sea are uplifted by tide, water flowing slowly, meander developed. Meander topography development is typical, especially at major rivers such as Sheyang River, Xinyanggang, Doulonggang, etc.

The coast at coastal plain region is the most typical silty sandy tidal beach in Jiangsu, on tidal beach tidal furrow develops commonly, with high water level mud beach, medium water level silty sand-ooze beach, low water level silty sand-fine sand beach distributing in sequence from coast to sea. From Longgang to Donggang there are at least four significant ancient coastal sand levees and ancient lagoons extending in north-south direction, alternately ranking from west to east. The region is flat overall, the highest altitude is near Jianggang, gradually lowering towards south and north wing. With Dongtai River as boundary, it is divided into south section and north section roughly, from north to south, tidal beach widening gradually. In north section (Sheyang River estuary-Dongtai River estuary), the beach is 5 km wide in average, in south section (Dongtai estuary-Beiling estuary) the tidal beach is the widest in Jiangsu. The widest beach near Jianggang Dongtai is about 14 km wide. If it is calculated by combining coastal high beach including sand ridges, namely calculated from Luegang-Tiaozini-Gaoni-Zhugensha, tidal beach is up to 40 km wide.

Another topographic form is sand ridges radial with Jianggang as the center. Radial sand ridges is a rare, unique coastal topographic form worldwide, extending 200 km in south-north direction, 140 km in east-west direction. There are total more than 70 underwater sand ridges whose height, form are different from each other. Between sand ridges are quirks which is steep and deep. The radial shoal is the most special undersea sand ridges worldwide, which is called “sea labyrinth”, is of significance in coastal science and marine geology, covering more than 20 thousand ha, being a major foraging site of migratory birds during low tide period. Radial shoal intertidal zone shallow beach wetland submerges during tide, emerges during low tide. There is rich

mollusk resource such as *Bullacta exarata*, clam, etc. There are rich shrimps and small fishes near waterline which are important food for migratory birds.

Fig. 2-8 Distribution of geomorphic types along Jiangsu coast

2.a-2-1-3 Climate

In the transitional zone between northern subtropical zone and warm temperature zone, Yancheng is with significant features of monsoon climate,

which is being different obviously between south and north. Within coastal zone it is warm climate, with annual average air temperature between 13-15℃. Due to adjustment of the ocean, it is warmer in winter half year and cooler in summer half year in shoal beach comparing to adjacent inland. Annual accumulated temperature with daily average air temperature no less than 0℃, is 4,900-5,100℃ in the north of the channel, 5,100-5,450℃ in the south of the channel. The closer to the sea, the longer frost-free period, however, frost free period in mudflat is 5 - 10 days longer than it in adjacent inland.

Rain and heat are synchronizing in the same season, with annual average rainfall of 900-1,000 mm. Influenced by monsoon climate, in the region torrential rain occurs frequently, inter-annual variation of rainfall is significant, seasonal distribution is uneven, with most rainfall occurring from June to September every year, during which rainfall accounts for 60%-70% of annual rainfall. Annual average evaporation in coastal region is between 1,400-1,700 mm, decreasing gradually from south to north. Relative air humidity varies with season, with relative humidity up to about 85% in July and August, and dry in autumn and winter. Annual relative humidity increases progressively from north to south, 70%-78% in the north of the channel, 80%-81% in the south of the channel.

Annual sunshine hours ranges from 2,100 to 2,650 along the coast and annual global solar radiation is up to 460-527 J/ (cm^2.a). In north of Subei irrigation general channel, annual global sun radiation is 494-527 J/(cm^2.a), sunshine hours is 2,400-2,650; in south of the general channel, annual global sun radiation is 460-5,494 J/(cm^2.a), sunshine hours is 2,100-2,400. 60%

annual global sun radiation concentrates between mid-May and mid-September, in most time annual global sunshine hours decrease from south to north, especially in spring (March to May) difference between south and north is most significant. Only from late July to late August, sunshine hours increase obviously from north to south.

Typhoon is a disastrous weather occurring frequently and most harmful in the region. Encounter of typhoon and astronomical tide can result in storm surge. Influenced by monsoon, many torrential rains occur in Yancheng, 3 - 4 torrential rains on average every year. Torrential rain mainly occurs from June to September, heavy rainfall mainly occurs in July and August, in accordance with the time of typhoon occurring, and most typhoon itself can bring downpour and heavy rainfall.

2.a-2-1-4 Hydrology

In the nominated properties, there are dense network of waterways, abundant rivers with rich runoffs. Annual average runoff depth at Yancheng is 288.1 mm, ranging 240-340 mm, distributing differently between in south and north regions. Its trend is basically in accordance with isogram of average rainfall in the same period, decreasing from south to north, northwest. The junction of Dafeng, Dongtai coast is the zone of large runoff depth, which is more than 340mm. The rivers in the region typically have max runoff in July to August, with summer runoff accounting for 70%-80% annual runoff. Average annual runoff into Yellow Sea is more than 200×10^8 m^3, rivers into the sea carrying sediment about 526×10^4 t/a. Evaluated value of average groundwater resource for multiple years in Yancheng is 215.596 m^3, influenced by sea water invasion, fresh water distribution in coastal region decreases progressively from north to south.

Rivers flowing into the sea through the nominated properties include Xinyang River, Doulong River, Aimaoyou River, Chuandong River, Liangduo River, etc. Because the nominated properties locate near estuary, except a few small-sized plain reservoirs, there is no lake, but large area coastal wetland distributes at the nominated properties, with natural wetland mainly distributing at intertidal zone outside coastline, belonging to silty sand-ooze coastal wetland; artificial wetland mainly distributing at the zone 5 km from coastline to land, with majority being fishpond and salt field.

Fig. 2-9 Distribution of Rivers in the nominated properties

2.a-2-1-5 Soil

Soil development of Jiangsu coast where the nominated properties locates is controlled by influence of two basic factors such as succession of ecological type of coast and variation of coastal morphological landscapes. Except regional mountainous brown soil developed by bedrock type Yuntai Mountain low mountains and hills and Shajiang black soil at coast of Ganyu county, in other plain coast, in the intertidal zone outside sea levee various coastal saline soil develops, inside the sea levee moisture soil distributes.

Coastal saline soil mainly distributes outside the sea levee at silty sand ooze type coast, salinity inherits natures of sea water, mainly containing chloride, pH between 7.5 to 8.5. Coastal saline soil can be subdivided into beach saline soil, meadow coastal saline soil and marsh coastal saline soil based on different tidal covering frequency, different soil forming process. Beach saline soil distribute in whole intertidal zone below high water level of major tide, in initial development stage of coastal saline soil. It maintains features of soil parent material, without layer difference, soil total salt>0.6%, phreatic water salinity >20g/l; above average high water level salt tolerant *Suaeda salsa*, Salicornia can grow, organic matter content more than 0.5%; below average high water level, no higher plant grows, soil organic matter typically less than 0.5%. Meadow coastal saline soil typically distribute between above high water level and sea levee, being the most advanced stage of intertidal zone coastal saline soil development; its soil parent material is not influenced by sea water basically, soil total salt between 0.1%-0.6%, salinity between 4-12g/l; grasses such as cogon grass, *Aeluropus littoralis*, *Zoysia macrostachya*, etc, grow on the beach, with topsoil organic matter content about 1.0%. Marsh coastal saline soil is the product of swampiness and de-

swampiness of soil in the ecology of intertidal zone marsh; marsh mainly includes reed marsh, *Spartina anglica* marsh, *Spartina alterniflora* marsh, etc., with soil salt content 0.2-0.8%, topsoil organic matter content above 1.0%, deeper organic matter profile distribution.

Frequently affected by such factors as artificial cultivation, irrigation and drainage, meadow coastal saline soil forms soil during cultivation and ripening. It mainly distributes at coastal reclamation zone, featuring topsoil being ripened from original shallow organic matter accumulation layer into agricultural horizon; subsoil becomes light colored, with lime deposit of, rust spot more obvious; bottom soil has rust spot, rust streak, obviously influenced by lifting effect of ground water capillary. Moisture soil is divided into two subgroups, one forms in subtropical mist climate zone, developed nu Jianghuai sediment, called gray fluvo-aguic soil, which mainly distributes in Nantong city and the south of Yancheng, with majority being light loam-medium loam; topsoil salt content below 0.2%, soil organic matter content about 1%; the other forms in warm temperature zone semi-mist climate zone, developed by Yi and Shu river sediment, called brown moisture soil, which mainly distributes at north coast, with alternation of sandy layer and clay layer, low organic matter content, soil salt content below 0.1%.

2.a-2-2 Shift of coastline

Except deeper thalassocratic sea water invasion in Holocene, the nominated properties region was roughly steadily in Ganyu, Banpu, Funing, Yancheng to Hai’an region for long time, forming several long shore bars near coastline, among which, Xigang, Zhonggang and Donggang are the most famous. Xigang starts from Ganyu Zhengyuan in the north, through Guanyun Dongfeng, Yangzhai, Longang to Xinghua, then south through Anfeng till to

the west of Hai'an, the sand levee formed about 7,000-5,000 years ago. Zhonggang starts from Ganyu Luoyang, Dasha, through Lianshui Tangji, Guanyun Qingshan and Guannan Xin'an, south to Yongfeng, then through Dafeng Sanxu and Xinghua Heta into Hai'an, connected with Yangtai Gushagang, which formed 4610±100 years ago. Donggang starts from Ganyu Fankou, Dasha, in the north, through Guanyun Xiache, Guannan Chengtou, Binhai Pangang and Jianhu Shanggang, the south through Goudun, Yancheng, Caonian and Dongtai into Hai'an region, the sand slevee had formed 3,300-3,900 years before and began to emerge more than 2,000 years ago at latest. In addition, in Sheyang Xintan-Yancheng Nanyang-Dongtai Sizao region, there is an ancient sand levee buried relatively deeply, which began to form about 1,000 years ago, emerging out of the sea surface in 15th century at the latest, becoming and natural sign of coastline in mid Ming dynasty. In 1023-1027 of Beisong dynasty, Fan Zhongyan built a Hanhaiyan, in later more than 30 years, the seawall built at coast under now Nantong was connected in to a wall from north of Funing, directly to Lusi, hundreds of Li long, becoming an artificial symbol of Jiangsu coastline in about 1,000 years ago.

Since 1128 the Yellow River seized estuary of Huai River, north section and middle section of Jiangsu coast advances siltation gradually. And since 7th year of Hongzhi Ming dynasty (1494) Yellow River took over Huai River whole basin, siltation speeds up greatly, coast moves east quickly. During 1128-1855, either the rate of estuary extension or delta growth, or land forming rate of coastal plain, is divided into two stages obviously: before 1494, siltation growth rate of Yellow River estuary is 54m/a; after taking over Huai River whole basin in 1494, estuary extension rate increased to 215m/a. Large

amount of silt brought into sea by Yellow River not only directly formed Subei Yellow River delta, but also formed vast coastal plain in the bay along two wings of the delta through effect of tide, wave.

North return of Yellow River in 1855 made Jiangsu coast experience another change of opposite dynamic silt condition, the source of large amount of silt was cut off, re-adjusting the coast and underwater shoal. During 1855-1890, from north of Biandan estuary to Yunyan estuary violent erosion retreated, from south of Biandan estuary to Yangtze River estuary siltation maintained; in later 30 years, the coast between obsolete Yellow River estuary and Sheyang estuary continued to be eroded, but less quickly. The coast in north of obsolete Yellow River estuary accepted eroded silt and entered siltation process, but later the coast also turned to be eroded, south section of coast constantly kept siltation; Yancheng coastline where the nominated properties locates evolves as follows since 1970s: the coastline from north of Huai River estuary to the junction point of Binhai and Sheyang is steady, the coastline in south of the section is mainly siltation type coastline, coastline section fron Sheyang estuary to Changshagang (Dayanggang) keeps higher speed of siltation towards sea.

Fig. 2-10 Sketch of Gushagang Profile

Fig. 2-11 Changes of Coastal Shoreline of a History Period in Jiangsu Province

Fig. 2-12 Erosion and siltation variation of modern Jiangsu coastline

2.a-2-3 Coastal wetland

Wetland types mainly includes intertidal zone natural wetland influenced by tide and artificial wetland. Natural wetland includes estuary zone planar water system, mudflat, reed salt marsh, *Suaeda salsa* salt marsh, *Spartina lterniflora* salt marsh, tidal creek, etc. Artificial wetland includes paddy field, various shoal culture ponds (sea water aquaculture pond and fresh water aquaculture pond). Wetland of the nominated properties shows the feature of extensive continuous distribution, its upper boundary is the boundary of natural distribution of wetland, lower boundary is edge of mudflat.

Fig. 2-13 Wetland type distribution of Jiangsu coastal area

2.a-2-4 Marine hydrology

2.a-2-4-1 Tide

When Yancheng tidal wave transmits from the Donghai Sea to Yellow Sea, it maintains the characteristics of progressive wave in south coast. When continuing north movement, due to reflection of Shandong Peninsula coast, it forms levorotary spiral waves. The amphidromic point of south Yellow Sea M2 partial tide is near N34°30′N, E121°10′. So Yancheng is mainly controlled by two tidal wave systems, crest line of these two tidal waves converge outside Jianggang wall, tidal wave convergence zone increases tidal range due to concentration of tidal wave energy, with M2 partial tide increasing by about 1.5m. In north Jiangsu coast, except that the tide is irregular diurnal tide near amphidromic point, in most of the rest is irregular semi-diurnal tide, in a small part of region it is regular semi-diurnal tide; in south sea area it is regular semi-diurnal tide due to influence of progressive wave transmitted from Donghai. Average tidal range in south sea area of Jiangsu coast is largerm between 2.5-4 m, and the sea area from qionggang to Xiaoyangkou is the area of max tidal range in the sea area, with average tidal range up to more than 3.9 m, gradually decreasing both to south and to north with Jianggang as the center. In Yancheng coast where the nominated properties locates, in the waters north of Sheyang estuary, except that in the sea area north of Lianyungang mainstream direction is WSW-ENE, in the rest most is NNW-SSE; tidal current is relatively weak, with average velocity of major tide is 1.2-1.3 kn; velocity of the largest egre current is up to 2.5 kn, max velocity of ebb current is up to 2.7 kn. In the sea area south of Sheyang estuary, west side of Dongsha is a strong current area, with average velocity of major tidal current more than 3kn, mainstream direction basically parallel to coastline; in east

side of Dongsha average velocity of major tidal current is about 2 kn, mainstream direction is mostly NNE–SSW, velocity of max egre current may be up to 3.8 kn near Wanggang, velocity of max ebb current is up to 3.6kn.

Fig. 2-14 Cotidal chart of north Jiangsu

2.a-2-4-2 Wave

In the nominated properties, northern waves prevail in whole year, most of which is stormy wave dominant compound wave. In south main direction of the wave is ENE, frequency is 8%, direction of strong wave is NW and N; in north In south main direction of the wave is ENE, frequency is 14%, direction of strong wave is NE. Autumn is the season when stormy wave prevails most, in September in the north of the sea area average max wave height is 2.9m, in south is 3.0m, annual variation of average wave height and average period is insignificant.

The wave at shoal outer edge and coastal zone outer side is larger than those near shore, wave height 3m isogram basically distributes along contour lines of shoal zone, about 20km from the shore. Wave height increases quickly from shore to sea. There are 3 major wave zones near the area where water

is about 15-20m deep, whose centers locate obsolete Yellow River estuary, Sheyang estuary and the place 200km at east of Qionggang, with max wave height up to 9m; in inner side of radial sand ridges only breaker wave crossing shoal appears, so wave weight is minor, no more than 2 m at most. In the sea area there are 5 wave convergence zones: from Guanhe estuary to Zhongshan estuary; obsolete Yellow River estuary; south of Biandanhe estuary; south of Sheyang estuary; Lusi and Qidong coast. Due to refracting effect of wave, in above 5 regions wave height increases, and when wave approaches breakage, normal included angle of wave ray and coastline is larger, resulting in coastal erosion of different degree or different form.

2.a-2-4-3 Sediment

Water bodies in the nominated properties are rich in sand. Sand content distribution features that sand content near shore is higher, forming a high value zone, sand content decreases gradually towards external sea. Sand content of water body near shore is related to stormy wave and tidal current, erosion effect of sediment suspension due to shallow water stormy wave, strong tidal current between sand ridges on bottom and side slop, all can increase sand content of sea water. In north sea area of radial sand ridges, sand content of major tide water body is above 0.1-0.2 kg/m^3 in summer, above 0.3-0.5 kg/m^3 in winter, while near shore, dynamic effect is strong, loose deposit is rich at shore side, resulting in vertical average sand content of sea water up to 1.0-2.5 kg/m^3, (Xinyanggang to Wanggang coast section). In south sea area of radial sand ridges sand content decreases gradually, outside Xiaoyangkou sand content of major tide water body is 0.4-1.3 kg/m^3, Lvsi at Xiaomiaohong is 0.2-0.7 kg/m^3. Suspended sediment content seasonally changes obviously, it is several even tens of times higher in winter

than in summer, related to interaction of circular current near shore resulting from monsoon effect. In Yancheng sea area suspended sediment mainly consists of clay and silty sand, gain size is typically larger in major tide period than in minor tide period, grain size of quick egre and ebb is typically larger than that of slow egre, ebb, corresponding to dynamics of egre and ebb.

2.a-2-4-4 Temperature and salinity

Average lowest temperature of coastal waters in the nominated property occurs in February: surface min water temperature in south sea area is 4.9℃, bottom temperature is 5.1℃; in North Sea area surface min temperature is 4.4℃, bottom temperature is 4.5℃. Jiangsu coastal waters max monthly average water temperature occurs in August: in south, North Sea area surface temperature is 27.4℃ and 26.8℃ respectively, bottom temperature is 26.0℃ and 24.2℃ respectively. Middle radial sand ridges sea area has characteristics of shallow water zone, range of annual water temperature variation of both upper layer and lower layer is up to 26℃, compared to whole sea area, and it is 1.0-1.5℃ lower in winter, about 3.0℃ higher in summer. In autumn and winter water temperature is lower near the shore higher far from the shore, in spring and summer is higher near the shore lower far from the shore.

Coastal waters are influenced by land runoff obviously, range of monthly average salinity variation is between 29.53-32.24, during low water season (December to the coming May) salinity is higher (31.32-32.22), in summer, autumn (June to November) salinity is lower (30.60-31.06), range of annual

salinity variation is about 9.7.

2.a-2-5 Radial sand ridges

(1) Morphological Characteristics of Sand Ridges

Radial sand ridges distributes at sea area of outer side of middle coastal zone of Jiangsu, south continental shelf of Yellow Sea, in north from Sheyang estuary, south to Haozhigang at north of Yangtze River estuary. It crosses in south-north direction ranging N32°00′-N33°48′, 200 km long; it crosses in east-west direction ranging E120°40′-E122°10′, about 140 km wide, covering about 2.8×10^6 ha. Generally with Jianggang as vertex, with Huangshaoyang as main axis, it radiates from the shore to the sea like an unfolded fan, made up of many ridges and tidal current passages separating sand ridges. Ridges distribute alternately, water is 0 – 25 m deep mostly, and individual quirk is up to 38m deep at most. Radial sand ridges is a general name of shoal that radially distributes and emerges out of sea surface, sand ridge concealing undersea, and tidal current passage between shoals or sand ridges. A large number of important information about the coastal environment evolution since the late glacial period is stored in the radiation bar, which is an important carrier to study the global environmental change and the interaction between land and sea.

Radial sand ridges are composed of more than 70 sand ridges and tidal current channels. The ridges vary with different shapes, and the ridges are separated by steep and deep grooves. Each sand ridge is different in size, width and length. The main large muds involve Tiaozini, Dongsha, Liangyuesha, Taipingsha, Maozhusha, Waimaozhusha, Jiangjiasha, Niujiaosha, Hetunsha, Taiyangsha, Huoxingsha, Lengjiasha and Yaosha.

They basically radially distribute within a sector with Jianggang as the center, centre angle 150°, extending in N, NE, E and SE direction, ridge and quirk alternating. Top of sand ridges is cut by quirk, with smaller sand body, multiple forms, appearing disordered; but the part other than top develops well. In the sea area in north of Jianggang , water is shallow, slop is slow, sand ridge body is large and continuous, and it distributes densely, with shallow quirk; in south sea area, water is deep, ridge is narrow and quirk is deep, sand ridge body is small and scattered. As sand ridge extends externally, altitude decreases, and gutters between sand ridges become from narrow to wide, from shallow to deep, with discontinuous quirk or deep pool in the gutter. North sand ridges are higher in west and lower in east, and south sand ridges are higher in southwest and lower in northeast. Radial sand ridges bottom materials are mainly fine sand, silty sand and muddy silty sand, deposit of sand ridge top is coarse, deposit at tail is finer. Strongly effected by tidal current, stormy wave, radial sand ridges separate, merge, disappear and grow, vary complicated. But generally they merge and expand, moving towards the shore. The shoal in the center of radial sand ridges or near shore are mostly in the state of gradually silting and rising, with silting rate about 2-8 cm/a, maximum is around 10 cm/a. The coastal part of the majority of sand ridges is exposed at low tide and becomes a sandbar with an area of 22,470 km^2, of which the area above 0 m is 3,782 km^2.

Fig. 2-15 Scope of Radial Sand Ridges

Fig. 2-16 Distribution of radial sand ridges

(2) The material of radial sand ridges

The most important source of material for the sediment is provided from Yellow River and Yangtze River. The sediment from Yellow River is mainly silt with clay, however, the sediment from Yangtze River is fine sand and silty clay. The main components of radial sand bar are fine sand with fine separation, the content is more than 90%, and the surface depressions contain silty sand. The inner segment and middle section of tidal current channel are fine sand; In addition, the content of silty sand increased in the middle section of the outer segment, mouth and some large tidal current channel, and the content of silt in the northern tidal channel increased more than that in the south. It is found that the main body of radiation sand ridge is the fine sand material of the Yangtze River system, and the fine particles of clay and silt are obviously supplied by Old path of the Yellow River (north) and

Yangtze River (south).

(3) The origin and evolution of radiation sand ridges

Abundant sediment and long-term stable special radial tidal current are the sufficient and necessary conditions for the formation and development of radial sand ridges in the South Yellow Sea. The radial sand ridges are the accumulation landforms under the action of tidal currents.

Researchers found that in the offshore of China, the velocity of flow is 1 - 3.5, and a depth of less than 35 m can form sand ridges. The rectilinear current ranged from 1 – 3.5 kn and rich loose deposit are the dynamic and material conditions of tidal ridge development. In the offshore of Jiangsu Province, the flow velocity ranges from 2 – 3 kn, and there is a large amount of loose deposit material, which has the condition of the formation and development of radial sand ridges.

In the process of advancing the south Pacific tidal wave in the North Yellow Sea, some of sandbars are blocked by the peninsula. With the interactions between anticlockwise rotation wave and South Yellow Sea's subsequent wave, an independent mobile wave system is formed in the open seas of Jiangsu Province.The tidal wave is restricted by the horn shape near the Jianggang, and it is rapidly advancing to the shore at a speed of about 100 km/h. Under the control of the mobile wave in the tide, the flood tide flows come from the north, northeast, east and southeast to the shore of the Jianggang River at high tide, and spread out in a 150° fan angle with the center of Jianggang.

After the Holocene sea invasion, it formed a small accumulation of sand body in the north east of the ancient Yangtze River estuary, which is the prototype

of radiation sand ridges. In the process of the rising of the Holocene sea surface, the tidal current erosion formed a long strip sand ridge, and gradually formed the south wing of radial sand ridges. Because the sediment is mainly from the Yangtze River, the south of the radial sand bar is significant. With the enhancement of radial tidal current, the radial sand ridges with a certain scale and roughly the north - south symmetry with East Platform as the apex are formed. In 1128, the Yellow River took the Huai River into the sea, and the amount of sediment increased greatly. With the interaction of tidal current and bank flow, the radiation sand bar grew rapidly.

Due to the gradual south bias of the Yangtze estuary, the sediment of the southern radiation sand ridges was gradually reduced, that forming a small asymmetric and huge radial sand bars. After the Yellow River returned to the old course, the whole radial sand ridges, especially the sand ridges in the north of Jianggang, lost the rich sediment supply of the Yellow River. At the same time, the Yangtze River estuary was moving southward, and the sediment supply of the Yangtze River is greatly reduced. The erosion of the land and the underwater part of the ancient Yellow River delta became the main source of material. Therefore, the whole radiation sand ridges had a tendency to migrate to the southeast, and this internal adjustment had been in progress.

Fig. 2-17 Tidal flat and creeks of Jiangsu Coastal area

(4) The dynamics of radial sand ridges

In the submarine region of radial sand ridges, the tidal current is strong and tidal range is large. The Dongsha flats are fragmented by the complex of tidal channels. However, Dongsha still looks like integrated vast flats at low tide because of the size over tens of thousands hectare.

On the *Comprehensive survey of coastal and tidal flats survey in Jiangsu*, Dongsha is the largest single tidal flat among the radial sand ridges system. Its size above 0 m of sea level exceeds 69,000 ha, and the size above middle tidal level is around 20,000 ha. The western end of Dongsha flat is 16 km away from the continent.

Fig. 2-18 Historical changes of Dongsha sand ridges

The sediments constituting radial sand ridges have two origins: 1. Sediments from the former Yellow River Estuary (existed from 1194A.D.-1855A.D.), and 2. Sediments from the Yangtze River Estuary of geologic time (before the late Pleistocene), which flew into Yellow Sea from Jianggang.Sediments from modern Yangtze River exert no influence on the radial sand ridges.

Because of the reclamation, the tidal channel between Dongsha and the

continent have been narrowed down. The tidal current consequently becomes strong and fast. A study by Nanjing University via remote sensing reveals that the western edge of Dongsha flat is eroded by the current continuously, while storm tides shrink its eastern edge. With the expansion of water channels, the Dongsha flat tends to move southeastwards gradually.

2.a.2-6 Biodiversity and Habitat

2.a.2-6-1Biogeography of the nominated properties

Bio-geography of the nominated properties belong to Oriental Deciduous Forest province of the Palearctic Realm (numbered 2.15.6, Udvardy, 1975), featured fauna and flora of temperature zones. It also belongs to Yellow Sea Ecoregion of WWF Global Ecoregion 200 classfication (number 203, WWF, Fig. 2-1).

2.a.2-6-2 Ecosystems

i. Habitat types

According to the global habitat classification by IUCN species survival subcommittee, the nominated properties consist of five habitats (Table 2-1).

Table 2-1 Habitat Types of the nominated properties (according to IUCN/SSC)

First-level IUCN / SSC Habitat	The nominated properties
1 .Forest	
2. Savannah	
3. Shrubland	
4. Grassland	●
5. Wetland	●
6. Rocky barren areas	
7. Caves & Subterranean	
8. Desert	

First-level IUCN / SSC Habitat	The nominated properties
9. Sea	●
10. Coastline/Intertidal	●
11. Artificial-Terrestrial	
12. Artificial-Aquatic	
13 .Introduced Vegetation	●

ii. Ecosystems

Tidal flats ecosystem is consists of supratidal zone, inter tidal zone and subtidal zone. Such ecosystem structure has been maintained by the tidal from the Yellow sea, and the sediments from rivers, in particular, the Yangtze River and Yellow River. Due to huge amount of sediments transported by the Yellow River and Yangtze River during the past thousands of years, the tidal flats of the Yellow Sea ecoregion has been extended from the coast line to the sea, and formed 3 million ha of tidal flats, which is the largest tidal flats in the world.

The supra-tidal zones feature with salt marshes, and consist of plant communities dominated by *Imperata cylindrica, Zoysia macrostachys, Suaeda salsa* and *Phragmites australis.* Freshwater marshes are mainly reeds community with the height of 150-250 cm, and the coverage rate of 60-70%, and mainly distributed at low wetlands and river estuary. Vegetation succeed from Suaeda communities to *Zoysia macrostachys* communities and then *Imperata cylindrica communities.* Besides, *Artemisia alkali* communities, *Angiospermae* communities, *Salicornia europaea* communities occasionally appear at the sites. Since 1980s, Spartina, an invassive species, which originally introduced from USA, has been spread along the coast lines. The invassive spartina has been out compete Suaeda communities, and hence caused negative impact on habitat qualities, in particular, for Suaeda gulls, and red-crowned cranes.

Fig. 2-19 Distribution of typical vegetation in the nominated properties

Fig. 2-20 Typical ecosystem types in the nominated properties

Dongsha Mudflat

Overlook of the nominated property

Marshes

Suaeda glauca

Phragmites australis

Eurynorhynchus pygmeus

Grus japonensis

Paradoxornis heudei

Grus japonensis

Egretta intermedia and *Egretta alba*

Elaphurus davidianus

Hydropotes inermis

Boleophthalmus pectinirostris

Philyra pisum

Periophthalmus modestus and *crabs*

Fig. 2-21 Wetland Ecosystem -consists of sub-tidal zone, inter-tidal zone, and supra-tidal zone (vegetated tidal flats), where sediments and nutrients have been exchange with the help of the tidal, and maintained ecosystem processes, as well as ecosystem services.

2.a.2-6-3 Vegetation

Flora of the nominated properties belongs to warm temperate deciduous broad-leaf forests and subtropical evergreen broad-leaf forest. It can be classified within two major sub-zones, namely deciduous oak forests of the south warm temperate zone, and north subtropical mixed evergreen broad-leaf forests deciduous broad-leaf forests.

i. Flora character of genera

There are 7 families, 7 genera and 10 species of ferns, 2 families, 6 genera and 8 species of gymnosperm, and 70 families, 217 genera and 306 species (subspecies and variety) of angiosperms. The plant genera recorded in the nominated properties can be classified into the 13 vegetation distribution types. The flora distribution are mainly consists of 43 genera of world wide distribution, 47 genera originated from pan-tropical region, and 43 genera originated from north temperate region, which represent a clear transition from pan-tropical to temperate climate zones.

ii. Vegetation types and its distribution

Five vegetation types recorded in the nominated properties, e.g., coastal salt soil vegetation, salt marsh vegetation, brackish water vegetation, and salt water aquatic vegetation.

Coastal salt soil vegetation

Salt soil vegetation distribution follows the soil salt content gradient from the sea to inland, and form a complete vegetation distribution spectra.

(1) *Suaeda glauca* (Bunge) Bunge community

Mostly dominated by single species, and occasionally accompanied by *Salicornia europaea.* It mainly distributes at tidal flats along the coast, from Xichao River Estuary to Sanbu Bridge of Sheyang County, and Zhonglu Harbour to Sanli Sluice Gate of Dafeng District, as well as the Dongling re-reclamation region of Dongtai County. Suaeda community coverage rate along the tidal flats ranges from 10 to 40%.

(2) *Zoysia macrostachys Communities*

Zoysia macrostachys is the main grassland species, and often develop the community with Spartina, an invassive species, together with *Imperata cylindrica* (Linn.) Beauv. *Phragmites australis* and *Suaeda salsa.* It mainly distribute at south of the Qionggang of Dongtai city, and Zhugang north of Dafeng District.

(3) *Aeluropus sinensis* (Debeaux) Tzvel． Community

It is the transitional vegetation between *Suaeda salsa* community and *Zoysia macrostachys.* It is one of the key grassland species, and have often been grazed by Chinese river deer *(Hydropotes inermis*) . Accompany species include *Suaeda salsa, Zoysia macrostachys* and *Phragmites australis.*

(4) *Imperata cylindrica* community

This community is widely distributed within the nominated properties, with some aggregation at from north of Qionggang of Dongtai city to Wanggan of Dafeng District. Species composition is rich, consists of many species and sub-groups of species, such as *Aeluropus sinensis*, *Zoysia macrostachys, Calamagrostis epigeios* (L.) Roth）, *Apocynum venetum* L. Corex, spp. and *Phragmites australis*.

(5) *Artemisia capillaries* Community

Salt Marsh Vegetation

(1) *Spartina alterniflora* Loisel. Community

It was introduced from USA, and has great tolerance to salt. It has been wide spread along Chinese coast since 1990s. The invasive species has been taking space from *Suaeda salsa,*and endangered red-crowned cranes, as well as Suaeda's gull habitat. The community has been dominated by the single species, with occasionally with *Apartina anglica* Hubb.

(2) *Carex scabrifolia* Steud. community

It is one of the pioneer species of the river estuary, often distributed at the low

elevation area of the supratidal flats, as well as the brackish water affected shore lines.

(3) *Scirpus planiculmis* Fr． Schmidt community

It mainly distributed at the river estuary between reeds marshes and water surface. It is also come mixed with Suaeda communities when freshwater intrude.

(4) *Typha angustifolia* community

It occasionally distribute at the nominated properties at the lowest wetland areas, often mix with reeds.

Brackish Water Vegetation

Brackish water vegetation mostly seen at tidal flats of the estuary. Most common species are *Phragmites australis*.*Scirpus validus* Vahl, *Scirpus* × *mariqueter* Tang et Wang and *Scirpus planiculmis.*

Salt Soil Vegetation

Often with simple community structure, and mainly distribute at the salt pan, and creeks.

(1) *Ruppiaceae* communities

Mainly seen at the edge of salt pan, or abandoned salt pan, some times seen at the creeks of the suprtidal flats. If salt content decreased, this community will be replaced by *Myriophyllum verticillatum* L.

(2) *Myriophyllum verticillatum* L. Communities

Common at the freshwater water body in the nominated properties, but can tolerate salt to some extend and distribute at the pond, as well as the creeks. However. With the decrease of water salt content, this community will be replaced by *Potamogeton crispus* L.

(3) *Potamogeton crispus* L.

Mainly distributed at the creeks in the nominated properties.

iii. Endemic groups or species

Among the whole 217 genera, only one is endemic to Jiangsu coast, e.g., *Glehnia.* Besides, there are 9 endemic species to China.

Table2-2 Endemic higher plant in the nominated properties

No.	Species	Category
1	*Limonium sinense*	Endemic
2	*Limonium bicolor*	Endemic
3	*Limonium ranchetii*	Endemic
4	*Glycine soja*	Endemic \ National Class II
5	*Scirpus mariqueter*	Endemic
6	*Vitex trifolia*	Endemic
7	*Zoysia macrostachya*	Endemic
8	*Platycodon grandiflorus*	Endemic
9	*Glehnia littoralis*	Endemic \ National Class II

Fig. 2-22 Picture of Endemic Species

Fig. 2-23 The distribution of plant in the nominated properties

2.a.2-6-4 Fauna

i. Fauna Composition

At least 680 species of vertebrates have been recorded at the nominated properties, including 415 species of birds, 26 species of mammals, 9 species of amphibians, 14 species of reptiles, 216 species of fishes, and 165 species of zoobenthos.

(1) Birds

According to field survey in 2017 and the records of two reserves, 415 species of birds have been recorded, which belong to 53 families and 19 orders. Most species rich orders are Passeriformes, with record of 158 species (38.07%), then Charadriiformes (60 species, 14.46%), followed by Anseriformes (38 species, 9.16%), Falconiformes (36 species, 8.67%), Lariformes (25 species, 6.02%), Ciconniformes (22 species, 5.30%), and Gruiformes (16 species, 3.86%)。

Table 2-3 IUCN Red Listed Species recorded at the nominated properties

Order	Species	IUCN Category
1	*Aythya baeri*	CR
2	*Grus leucogeranus*	CR
3	*Eurynorhynchus pygmeus*	CR
4	*Ciconia boyciana*	EN
5	*Mergus squamatus*	EN
6	*Grus japonensis*	EN
7	*Numenius madagascariensis*	EN
8	*Tringa guttifer*	EN
9	*Gorsachius goisagi*	EN
10	*Platalea minor*	EN
11	*Calidris tenuirostris*	EN
12	*Pelecanus crispus*	VU
13	*Grus vipio*	VU
14	*Larus saundersi*	VU
15	*Egretta eulophotes*	VU
16	*Melanitta fusca*	VU
17	*Clangula hyemalis*	VU
18	*Coturnicops exquisitus*	VU
19	*Podiceps auritus*	VU

Order	Species	IUCN Category
20	*Anser cygnoides*	VU
21	*Anser erythropus*	VU
22	*Aythya ferina*	VU
23	*Calidris tenuirostris*	VU

Remarks：CR: Critically Endangered；EN: Endangered；VU: Vulnerable

Among the 415 bird species, 36 are resident species (8.67%), 60 are summer resident species (14.46), 123 are wintering species (29.46%), 210 species are passing migrating species (50.60%). Besides, there are 66 species breeding at the nominated properties (15.90%).

At least 23 species are threatened species (checked from IUCN Red Listed species, 2016), including 3 critically endangered (CR), 8 endangered (EN), 12 vulnerable (VU) (Table 2-2).

With reference to another assessment results by East Asia-Australasia Flyway Partnership, Jiangsu Yancheng National Nature Reserve ranked top three among 1030 key wetlands of the flyway that across 22 countries and regions (Table 2-3). However, if the score take into consideration of the whole Yellow Sea-Bohai Sea, namely, northern Bohai bay, Yellow River Delta, and Geum (Kum) estuary.

Table 2-4 The most important wetlands along the East Asia-Australasia Flyway

Order	Country	Wetlands	Contribution to the EAAF
1	China	Poyang Lake	1056
2	Australia	Eighty Miles Beech	677
3	China	Jiangsu Yancheng National Nature Reserve	417
4	Russia	Moroshechnaya Estuary	392
5	China	East Dongting Lake National Nature Reserve	386
6	Russia	Darwul Nature Reserve	372
7	Cambodia	Prek Toal	294
8	China	North Bohai Bay	285
9	South Korea	Geum (Kum) Estuary	259
10	China	Shengjing Lake National Nature Reserve	245
11	Bangladesh	Tangua Haor Complex	222
12	USA	Yukon-Koskwen Delta	216

13	China	Yellow River Delta	215

IUCN identified 16 key habitats for the East Asia-Australasia Flyway (IUCN 2013), including 7 sites from the Yellow Sea-Bohai Sea region, and Yancheng coast is on the list.

Fig. 2-24 Distribution of the key habitat for the East Asia-Australasia Flyway. Red colored sites for Yellow Sea-Bohai Sea region, and green-colored sites for the South-east Asia and Hongkong SAA of China.

Cited from IUCN situation analysis on East and Southeast Asian intertidal habitats, with particular reference to the Yellow Sea (including the Bohai Sea)

Outstanding and representative species of birds from the nominated properties:

(i) Red-crowned crane (*Grus japonensis*）

Red-crowned crane is one of the giant waders, and the endangered species in the world. New estimation of the global population ranges between 1450 to 1550. The highest record of red-crowned crane population at Yancheng was 1200, however, due to both climate change, and habitat degradation, wintering population at Yancheng reduced to 500 to 600, a bit share of the Chinese wintering population stay at Yellow River Delta, a few hundred kilometers north of Yancheng.

(ii) Spoon-billed sandpiper (*Eurynorhynchus pygmeus*)

It is one of the most endangered birds in the world, with the global population less than 400, and has been listed as the critically endangered species by IUCN. The highest record of this species in Yancheng was 221 in 1991. It can be sighted every year, with flocks of 10 to 20.

(iii) Reed parrotbill (*Paradoxornis heudei)*

This is an endemic species to China, and inhabit reeds along the Chinese coast, lower reaches of Amur River.

Grus japonensis, *Grus grus* and *Grus monacha*

Eurynorhynchus pygmeus

Paradoxornis heudei

Fig. 2-25 Outstanding and Representative Birds from the nominated properties

Fig. 2-26 Distribution of Red-crowned crane in the nominated properties

Fig.2-27 The distribution of avian habitat

(2) Mammals

The nominated properties have recorded 27 species of mammals that belongs to 6 orders and 12 families, of which most are rodents. However, two species have global significance that worthwhile to mention here. The first one the Pere David's Deer, which was re-introduced from the UK in 1986 with the help of WWF International. This species was originally distributed in the lower reaches of Yellow River, and middle and lower reaches of Yangtze River, but had been as the main game animal in the history, but eventually been driven to extinction in the wild. Only a small population were reserved in the zoos in Europe. In 1986, 39 Pere David's Deer were introduced in Dafeng District of Yancheng Municipality, and the population grow steadily at the nature reserve, with the population exceed 4000, among which 846 have been fully released to the nature habitat in the coast area of Yancheng.

Another mammal species worth to mention is the Chinese River Deer (*Hydropotes inermis).* It was also widely distributed in southern China and Eastern China. However, due to loss of habitat, its distribution area has been shrunk to only Yancheng tidal flats, Hongzhe Lake of Jiangsu, Poyang Lake, as well as the Zhousan archipelago. It is estimated its population is around 3-4 hundreds in Yancheng tidal flats.

Fig. 2-28 Distribution of Pere David's Deer in the nominated properties

Elaphurus davidianu

Hydropotes inermis

Fig. 2-29 Representative mammals from the nominated properties

(3) Amphibians

Nine species of amphibians have been recorded in the nominated properties, which belongs to one order and four families. One species, *Pelophylax nigromaculatus* is on the red list of IUCN threatened species as the Near threatened species.

Fig. 2-30 Representative amphibian species, *Pelophylax nigromaculatus*

(4) Reptile

Most recent monitoring shows there are 14 species of reptiles in the nominated properties, among which 8 species are snakes, 5 species are lizards, and the last one is tortoise, which is a vulnerable species from the IUCN Redlist.

(5) Fishes

Recent inventory revealed 216 species of fishes, among which, 14 are on the threatened species list of IUCN.

Table 2-5 IUCN Red Listed Species recorded at the nominated properties

Orders	Latin Names	IUCN Threatened Categories
1	*Acipenser sinensis*	CR
2	*Sphyrna lewini*	EN
3	*Aetobatus flagellum*	EN
4	*Carcharias taurus*	VU
5	*Alopias vulpinus*	VU
6	*Cetorhinus maximus*	VU
7	*Carcharodon carcharias*	VU

Orders	Latin Names	IUCN Threatened Categories
8	*Carcharhinus plumbeus*	VU
9	*Sphyrna zygaena*	VU
10	*Squatina japonica*	VU
11	*Narke japonica*	VU
12	*Platyrhina sinensis*	VU
13	*Beringraja pulchra*	VU
14	*Hippocampus trimaculatus*	VU

Fig.2-31 Representative fish species, *Acipenser sinensis*

(6) Zoo-benthos

Recent inventory revealed 165 species of Zoo-benthos. Zoobenthos play a role of material transformation and energy transfer in wetland ecosystem, and their ecological value is very important. Benthic fauna is the main source of food for many migratory waterbirds, and it is an important factor to determine the number of birds. The number of benthic animals is positively correlated with the number of coastal birds feeding on it. At the same time, maintaining the functional integrity of benthic community is of great significance to maintain the ecological system function of heritage nomination.

Fig. 2-32 Representative Zoobenthos from the nominated properties

2.b History and Development

2.b-1 Nature History

Yancheng has very long history. Changes of Land and Sea in Yancheng since 70,000 years ago. The situation of geology and landform in Xiahe Plain, Huanghuai Plain and Binghai Plain has been formed by geologic process and climate change. They made from the sand and soil blow by strong wind and transport by Yangtze River, Yellow river and Huai River. 20,000 yr BP, at the end of late Pleistocene, and the Last Glacial Maximum. According to China's cold and arid climate and marine regressions, Huanghai continental shelf was exposed and a terrace sequence was formed. Hongzehu lake and west bank of Gaoyou Lake was the first stage terrace, east of Fangongdi was the second-stage terrace, which elevation is 13-20 meters higher relative to the first stage terrace. The boundary of Yacheng city was hundreds kilometers away from coastline, Yancheng used to be an inland city. Archaeologists have found many late pleistocene fossils of horns, teeth, and body from *Elaphurus davidianus, Cervus axis, Hydropotes inermis,* and *Sus scrofa* in Dafeng, Tinghu, Jianhu and Dongtai. The alveolar stones (tafone) which formed at 50,000 yr BP have been found in the river mouth of Sheyang. All these fossils indicate that there were inland forests, grasslands, wetlands and lagoons in Yancheng area 10,000 to 20,000 years ago.

Fig. 2-33 The alveolar stones (tafone) found 27 meters underground in the river mouth of Sheyang.

2.b-2 Human History

In Tang Dynasty, Yancheng is one of the most important port and strategic pass of China. According to the new and old "History Tang Dynasty”, the monk of Koryo, Feng Dasheng, the prince of Silla, Kingshixin and the Japanese emissary MASATO AWADAN all went to Chang’an or left China through Yancheng. For encouraging navigation, Haichunxuan tower was built at Dongtai, the southern part of Yancheng in Tang Dynasty. For guarding the custom, an ancient “scaling ladder” was built at Xiangshui, the northern part of Yancheng where was an ancient river mouth of Huai river. The Tang Dynasty scaling ladder is called the first custom in Jianghuai Plain.

Fig. 2-34 Haichunxuan tower, built in Tang Dynasty.

Fig. 2-35 The Tang Dynasty scaling ladder which is called the first custom in Jianghuai Plain.

Fangong Sea Wall: In 2nd- 6th yr of Song Dynasty (Between 1024-1028 A.D.), people have built a 75-kilometer-long rocky sea wall which is 10 m weight at the base, 3.3 m at the top and 5 m high. This sea wall was very useful for wave resistance, the saline-alkali soil has become good farmland after that. Thanks to the sea wall, more residents in Yancheng, Xinghua and Hailing had better development on farming and salt business. After completed the

Fangong Sea Wall, there is long period till the Yellow river change its riverway to Huai river.The agriculture in the western part of this sea wall named Xialihe area has developed quite well. In Earlier Song Dynasty, this area has rich soil and famous for its tea, salt and silk cloth which supplied big sum of tax for the Song government. Thousands of households have settled down here. In Song Dynasty, they expanded and strengthened the sea wall from south to north day by day. Finally, the sea wall was 400 km long from Lusi to Miao bay. It was a great water conservancy project in northern Suzhou. At the same time, canals were built in this area. It also helped the salt business and agricultural irrigation. After the Fanning Sea Wall was built, the people who used to move out of Yancheng were coming back for farming and salt manufacturing.The GDP attained historic peak levels.

In 1128, the Yellow river change its course to Si River and Huai river by first time. Because of the river way's changes and floods, good farmlands in this area covered by sand and small rivers and canals blocked. The agriculture economic depression. Soil and sand were also brought to the ocean by Yellow river which made the coast shift to the east. Salt business has deteriorated too.

In the early Qing Dynasty, salt business still existed. Thousand kilometers of coast beach contribute suitable habitat to wildlife. Hundreds and thousand mammals and birds moved around. Hunters were followed. Hunting became a good business, more than 2,000 households live on that. People started to use wild birds’ feather to made fans, duvets and jackets. But because of the coast kept moving east, people live on had to move to the east. The old saltern became farmland. In mid and late Qing Dynasty, the government helped to discover new salterns and revitalization salt industry.

Fig. 2-36 Map of salterns in Qing Dynasty

2.b-3 The conservation history of nominated heritage

The Yellow Sea-Bohai Sea Wetlands include Jiangsu Yancheng National Nature Reserve, Jiangsu Dafeng National Nature Reserve. Since the establishment of two nature reserves, the government at all levels has attached great importance to the development of the nature reserve management. With the strong support of the government at all levels, the protected areas have developed rapidly, and the establishment of the regional management service has also developed. It has been accepted as MAB network member by UNESCO Man and Biosphere Program, northeast Asia crane protection area network by Asia Pacific Migratory Water Birds Conservation Committee, and Ramsar site by ramsar Convention secretariat, etc., which has played a positive role in the development of nature reserves.

Table 2-6 Historical events of the conservation history in Yancheng

Time	Events
1983	**Nature reserve was set up by Jiangsu Provincial Government**
1985	Surveying and mapping of the nature reserve
1986	Set up of Jiangsu Dafeng National Nature Reserve
Mar., 1988	nature reserve management policy issued
1990	“Land Use Rights Certificate” issued to Yancheng Nature Reserve
Oct., 1992	Yancheng Nature Reserve graded up to national nature reserve
Nov., 1992	Yancheng National Nature Reserve joined to the World Network of Biosphere Reserves and named “Yancheng Biosphere Reserve” by UNESCO
1995	Jiangsu Dafeng National Nature Reserve. joined to the World Network of Biosphere Reserves and named “Biosphere Reserve” by UNESCO
1996	Yancheng National Nature Reserve joined North-east Asia Crane Conservation Network
1997	Jiangsu Dafeng National Nature Reserve graded up to national nature

Time	Events
1983	**Nature reserve was set up by Jiangsu Provincial Government**
	reserve
2002	Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve designated as Ramsar Site
2002	“The management laws of Yancheng National Nature Reserve” promulgated
2003	Jiangsu Dafeng National Nature Reserve joined the EAAFP
2006	Changed the area, range and function division of Yancheng National Nature Reserve
2012	Boundary and zoning of Yancheng National Nature Reserve adjusted by State Council
Sep., 2014	Yancheng National Nature Reserve joined International Alliance of Protected Areas

In recent years, the two nature reserves have established excellent cooperative partnership with local authorities, primary schools, and many universities, thus two nature reserves have become the bases for the ecological education and moral education of many institutions. Many organized events, such as "Bird-loving week", "Fight for the King Deer", were held in these years. Many bird-watching organizations had carried out bird observation in the areas of nominated properties, which promoting the protection of the environment and ecological awareness among the local community residents, students, teachers and institutions involved in the activities.

Through the above-mentioned activities, we hope to protect the wildlife habitat, restore the population, improve the ecosystem function, establish a monitoring system, and enhance the local residents' ability to protect and manage natural resources. The authority of the two nature reserves also provides financial support, protection planning, and evaluation of the effectiveness of the community.

Paulson Institute observed the Pere David's Deer

Dr Liu Bin and his students went birdwatching

Pere David's Deer popular science activities

Bird-loving week jointly organized by Nature Reserves and Dafeng forest public security in 2017

Fig. 2-37 Conservation activities of nominated heritage

3. Justification for Inscription

3.1.a Brief synthesis

The Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China consist of natural landscapes such as deltas, sandbanks, mudflats, saltwater/freshwater marshes, rocky shores, islands and ancient coastlines, as well as salt pans, fish ponds and rice paddies, ranging from the Yalu River estuary to the Yangtze River estuary. The coast of Yellow Sea-Bohai Gulf contains the world's largest continuous mudflat seashore. Sediments and nutrients are continuously discharged from the Yellow River and Yangtze River (two of the world's longest ten rivers) and other rivers including Yalu River, Liao River, Luan River and Hai River, and form fertile mudflats, radial sand ridges and sandbanks. These intertidal landforms, together with sand dunes, lagoons, rocky shores, and islands, provide diverse habitats for migratory birds. Nowadays, the dynamic process of river sediment discharge and continental shelf sedimentation continues to shape the geological landscape and ecosystem on the Bohai Gulf-Yellow Sea coast, making it one of the most diverse and fertile coasts in the world, and fascinating habitats for migratory birds on the East Asian-Australasian Flyway.

In recent years, the Yellow Sea ecoregion has raised continuous high attention from all over the world. The IUCN World Conservation Congress (Jeju, Korea 2012) unanimously agreed on the "conservation of the East Asian-Australasian Flyway and its threatened waterbirds, with particular reference to the Yellow Sea" (Resolution 5.028), highlighting the global importance of the Yellow Sea. Four years later, the IUCN World Conservation Congress (Hawaii, U. S. 2016) again adopted a resolution on the "conservation of intertidal habitats and migratory waterbirds of the East Asian-

Australasian Flyway, especially the Yellow Sea, in a global context" (Resolution 6.026), recognising the outstanding universal value of the Yellow Sea region. The resolution also suggested to consider the possibility of World Heritage nomination for the intertidal zone of Yellow Sea, to promote its protection and sustainable development.

The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a serial nominated property ranging from Northeast China to East China, providing key stopovers, wintering grounds or breeding grounds for multiple threatened migratory bird species, constituting one of the world's most diverse and magnificent temperate coastal landscapes and ecosystems, and an indispensable part of the global biodiversity conservation. The serial nominated property are key stopovers, wintering grounds or breeding grounds for some of the world's most noticed threatened bird species, including two critically endangered water birds: the Chinese crested-tern (*Thalasseus bernsteini*) with the global population just more than a hundred, the spoon-billed sandpiper (*Eurynorhynchus pygmeus*), with only hundreds of individuals left in the world. Almost all individuals of the Nordmann's greenshank (*Tringa guttifer*), the great knot (*Calidris tenuirostris*), and the Far Eastern curlew (*Numenius madagascariensis*) depend on these habitats.

The Migratory Bird Sanctuaries along the Coast of Yellow Sea- Bohai Gulf of China will be submitted to apply for the inscription on world heritage list in three phases, and the Phase I includes two component parts: 1) Jiangsu Dafeng National Nature Reserve, and the southern section and the Dongsha experimental zone of Jiangsu Yancheng National Nature Reserve (YS-1) in Jiangsu Province, southwest Yellow Sea coast; and 2) the middle section of Jiangsu Yancheng National Nature Reserve (YS-2). The two components are separated by the Dafeng Port and the surrounding areas with dense human

activity, with their boundaries about 30 kilometers apart. The East Asian-Australasian Flyway Partnership assessed the importance of 1030 reserves and migratory bird habitats on the flyway. The results showed that the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast, and are thus suitable for the first phase of the nominated property.

1) Jiangsu Dafeng National Nature Reserve, and the southern section and the Dongsha experimental zone of Yancheng National Nature Reserve (YS-1). The component part covers an area of nominated property 109,370 ha, plus a buffer zone of 23,188 ha on the west. Dafeng contains typical habitat types of secondary forest on marine deposition plain and freshwater reed marsh. The southern section of Yancheng Reserve and Dongsha embody the complete ecosystems of intertidal mudflats, radial sand banks and sand ridges. Dafeng is home to the world’s largest captive population and largest reintroduced population of Père David's deer (or milu, *Elaphurus davidianus*). The southern section of Yancheng Reserve and Dongsha provide an important stopover site for the waders on the East Asian-Australasian Flyway. Half of the world’s spoon-billed sandpipers and Nordmann's greenshanks make long stopovers, feed, or even moult in the nominated property and surrounding areas.

2) The middle section of Jiangsu Yancheng National Nature Reserve (YS-2). The component part is located in Sheyang County, Tinghu District, Yancheng Municipality, Jiangsu Province, containing the core area in the middle section of Jiangsu Yancheng National Nature Reserve. The area of the nominated property is 43,804 ha, plus a buffer zone of 51,785 ha on the west. The middle part of Yancheng Reserve mainly consist of habitat types of freshwater reed marsh and intertidal mudflat. It provides the most important

wintering ground for the migratory population of red-crowned crane (*Grus japonensis*), with about 50% (in some years 80%) of individuals spending the winter here each year.

The area involved in the nominated property above constitute the largest intertidal flat on the west bank of Pacific Ocean. Within the two component parts, large tracts of coastal habitats remain less disturbed by human activity, retaining the natural ecosystem structure and functions, becoming one of the natural coastlines rare in this country and the world. The main body of the marine deposition plain and mudflat is formed before 1855, when Yellow River changing its course back to the north. Nowadays, the intertidal mudflat is still mainly in the process of accumulation under the special marine hydrological conditions. The above process has shaped the crucial habitat for threatened species such as the red-crowned crane, the spoon-billed sandpiper and the Nordmann's greenshank in the nominated property. These habitats, together with other sites along the Chinese coast to be nominated in the future, form indispensable links in the conservation network for more than 20 threatened bird species on the East Asian-Australasian Flyway.

3.1.b Criteria under which inscription is proposed

According to the *Operational Guidelines for the Implementation of the World Heritage Convention*, the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) are nominated under the criteria (ix) and (x).

Justification for inscription under these two criteria is as follows:

(ix) be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities

of plants and animals;

Since the Pleistocene, great rivers such as the Yellow River and the Yangtze River have been endlessly flowing into the Yellow Sea and the Bohai Gulf, carrying massive material from the Qinghai-Tibet Plateau and the Central Asian desert. On the other hand, the continental shelf in Yellow Sea and Bohai Gulf have been in the process of continuous subsidence. Accumulation of river sediment discharge and tectonic subsidence, combined with marine hydrological processes and climate change, have jointly shaped the natural landscape along the Yellow Sea and Bohai Gulf coast, forming the basis for the occurrence and evolution of ecosystems.

The nominated properties have long been under the influence of the Yangtze River, the largest river in Asia. Between A.D. 1194 and 1855, the Yellow River, with the largest known sand discharge, used to enter the sea near the nominated properties. The nominated properties are located in a region where the river (terrestrial) and marine ecosystems interact intensely, probably the most typical of its type in modern times. A large amount of river sediment discharge interacts with the ocean current to form intertidal mudflats and unique radial sand ridges.

During the sea transgression and regression since the late Pleistocene, the sediments discharged from the ancient Yangtze River estuary and Huai River estuary have accumulated to form more than 30,000 km^2 of radial sand ridges centered at Jianggang, under the influence of special radial flow in the coastal waters of Yellow Sea. Radial sand ridges, sand banks and tidal channels constitute the largest part of the nominated property Dafeng and Dongsha of Yancheng. Radial sand ridges have always been changing under the intense influence of tidal currents and storms, but the general trend is to merge and expand, and to move toward the shore. Sand banks in the middle of the radial

structure or close to the shore are mostly accumulating and growing. The dynamic changes of these landscapes driven by changes of river and marine hydrology and climate have become the major driving forces of the evolution of ecosystems and even species. It is in order to feed on the diverse benthic animals living in such dynamically changing habitats that the waders here undergo adaptive divergent evolution.

The coastal area within the nominated area the Middle Section of Jiangsu Yancheng Wetland Rare and Endangered Waterfowl National Nature is mainly plains formed by marine deposition. Due to the tidal asymmetry (fast flood tides and slow ebb tides), the sediments transported by tides can be accumulated in the intertidal zone. This is an important driving force for the formation of the plains. Large rivers discharge into the southern Yellow Sea a large amount of sediments, which are then suspended and transported by tides and waves to be deposited in the intertidal zone. Meanwhile, the coastal plain continuously silts up, advancing to the sea, forming unique intertidal mudflats. The vegetation zones in the nominated area shows remarkable characteristics of coastal wetland vegetation: with changes of soil salinity and seawater submergence, the vegetation structure in the nominated area shows obvious transition and clear succession. From the sea side to the land side, the transition types are: mudflat with no vegetation, Spartina alterniflora marsh, Suaeda glauca marsh, Aeluropus sinensis grassland, Imperata cylindrical grassland or reed marsh. On the most salty mudflats with no vegetation live the most abundant benthic animals, which provide rich food resources for migrating birds. On the land side of the mudflats, Spartina alterniflora communities exist in some areas. Further toward the land side grow salt-tolerant plants, such as Suaeda glauca and Salicornia europaea. In the areas with salinity as low as 0.6% -1.0%, the amount of Aeluropus

sinensis increases in the Suaeda glauca community. The type of vegetation that appears furthest toward the land side is Imperata cylindrical grassland, often accompanied by Setaria viridis, Artemisia capillaris, reeds Phragmites communis, Zoysia macrostachya and other plants. In addition, large reed communities distribute in water-rich areas, such as lower mudflats and the estuarine zone. These areas often used by birds such as red-crowned cranes. The spatial distribution of habitat types and vegetation communities change with the dynamic changes of the muddy shore, forming the basis for the maintenance of biodiversity.

Fig. 3-1 Zonation of wetland vegetation and landscape in the nominated property

These two nominated properties not only represent the typical characteristics of the coastal and marine ecosystems and their changes in landscape pattern, but also highlight the evolution of their plant communities against the background of the dynamic changes in coastal landscape. At the same time, their ecosystem supporting services also fully reflect the ecological and

physiological processes in various organisms related to adaptation and evolution, making the area an outstanding example of coastal and marine ecosystems.

(x) contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or conservation.

The Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China concentrates threatened bird species and their habitats of global concern, and has outstanding value in conservation and scientific research. These areas are located on the East Asian-Australasian Flyway, where the number of threatened waterbird species is much higher than the other seven major flyways in the world. Moreover, the first phase of the serial nomination involves the flyway's highest-rated reserve and key habitat for threatened birds.

The nominated properties are located in the south of Yellow Sea Ecoregion (#203 in the WWF Global 200 Ecoregions), containing the world's largest continuous mudflat seashore, already listed as important wetlands in the Ramsar Convention. As one of the best preserved intertidal mudflats, Jiangsu Yancheng National Nature Reserve has joined UNESCO's Man and Biosphere reserves network. The area features rich biodiversity, providing key stopovers, breeding grounds and wintering grounds for millions of migrating waterbirds on the East Asian-Australasian Flyway.

Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1) is located in the central keynode range of East Asian-Australasian

Flyway, 7000 kilometers apart from both the breeding and wintering grounds of waders, and thus serves as an indispensable stopover and “gas station”. For waders, Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1) and the vast surrounding area is the largest and the most important stopover on this flyway. It is estimated that at least two million waders use the area during their northward migration, accounting for more than 40% of the migratory waders on the flyway. There are also massive waders – at least a million – passing the area during the southward migration. The radial sand ridges and surrounding areas where Dongsha is located are the autumn stopover and moulting ground for more than 50% of spoon-billed sand pipers, a globally critically endangered species. The tidal channels in the radial sand ridges are habitats for the migratory fish Japanese grenadier anchovy (*Coilia nasu*), and the representative fishes of the Yellow Sea, large yellow croaker (*Larimichthys crocea)* and yellow croaker (*Larimichthys polyactis*), as well as important feeding grounds for the critically endangered Chinese sturgeon (*Acipenser sinensis*). At low tide, the sand banks emerge from the sea, providing breeding ground for massive benthic animals, and feeding grounds for critically endangered birds like spoon-billed sandpiper and Far Eastern curlew. In addition, Dafeng is currently home to more than two-thirds of the global population of wild Père David's deer, providing a model for reintroduction and rewilding of large mammals after extinction in the wild.

The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2) is an important habitat for the critically endangered species Baer’s pochard (*Aythya baeri*) and Siberian white crane (*Leucogeranus leucogeranus*). It is also the most important wintering ground for the endangered species red-crowned crane (*Grus japonensis*), with the wintering population accounting for more than 40% - 55% of the species’ migratory population. Meanwhile, the

nominated property is also a stopover site for about 10% of the population of the endangered species black-faced spoonbill (*Platalea minor*), and one of the important breeding and wintering grounds for the vulnerable species Saunders's gull (*Larus saundersi*).

Table 3-1 Bird species with 1% of the global population depending on the nominated property

Order	Latin name	IUCN category
1	*Eurynorhynchus pygmeus*	CR
2	*Platalea minor*	EN
3	*Ciconia boyciana*	EN
4	*Grus japonensis*	EN
5	*Tringa guttifer*	EN
6	*Calidris tenuirostris*	EN
7	*Egretta eulophotes*	VU
8	*Pelecanus crispus*	VU
9	*Anser cygnoides*	VU
10	*Larus relictus*	VU
11	*Larus saundersi*	VU
12	*Calidris canutus*	NT
13	*Limnodromus semipalmatus*	NT
14	*Limosa limosa*	NT
15	*Numenius arquata*	NT
16	*Limosa lapponica*	NT
17	*Calidris ferruginea*	NT
18	*Charadrius leschenaultii*	LC
19	*Charadrius mongolus*	LC
20	*Arenaria interpres*	LC

Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) provide irreplaceable habitats in the conservation of threatened birds like red-crowned crane and spoon-billed sandpiper, a precious example of the reintroduction of Pere David's deer, and feeding grounds for endangered fishes. The nominated properties have outstanding value for international biodiversity conservation.

3.1.c Statement of integrity

The Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China involve large tracts of mudflats, beaches and other habitats

connected to them through the migration of birds, consisting the largest coastal migratory bird habitat system, serving as key stopovers for bird migration between the two hemispheres and an important part of the East Asian-Australasian Flyway. The vast space provide high quality rest stops for more than a hundred species and millions individuals of migratory waterbirds, to replenish the fat they need for the continued flight.

Differences in natural history and landscape result in varied habitat conditions across the vast space along the Yellow Sea-Bohai Gulf coast. Different threatened species select different sites for congregation. Certain species also selects different sites during different seasons or different phase of their lifecycle. The sites of serial nomination will insure the survival of all threatened species when they pass the ecoregion, and constitute an integrity of habitat networks.

Phase I of the serial nomination include all the intertidal wetlands undisturbed by human activity, including two existing nature reserves, especially the radial sand ridges covered by the reserves. The nominated properties adequately reflect and protect all kinds of natural, dynamic elements of the intertidal wetlands. The area presents a coherent landscape spectrum, from wetlands on the land side to radial sand ridges, showing comprehensively the evolution of landforms and habitats related to tidal processes.

Yancheng wetlands on the Yellow Sea coast feature unique, complete intertidal mudflats in fresh water, brackish water and salt water zones. The nominated property (Phase I) and buffer zone area of more than 220,000 hectares will ensure the continuity of ecological functions, and the ecological processes in the intertidal zone can happen without restriction. Sufficient area, high quality mudflats and undisturbed natural ecosystems provide good stopovers and ample space for migratory birds.

The delimitation of the nominated property and buffer zone follow Guide to the operation of the World Heritage Convention (2016), meets the requirement of integrity and conservation management.

(1) The property includes all elements necessary to express its Outstanding Universal Value.

The delimitation of the nominated property and buffer zone follow Guide to the operation of the World Heritage Convention (2016), the principles are:

Include all the key features and elements contributing to the outstanding universal values of the nominated property;

Include continuous areas of sufficient size to ensure and represent the integrity of natural landscape, natural phenomenon, and biodiversity conservation;

Ensure the integrity of geography unit, following natural boundary as far as possible;

Avoid human activities posing negative impact on OUVs, e.g. harbors, industrial regions, artificial reservoirs, and aquacultural ponds;

Ensure the property to be covered by existing protected areas;

Cover the key habitat for threatened birds to the greatest extent, including foraging fields, stopovers and roosting sites;

The buffer zone stretches on the west of the nominated property, providing protection from the inland side, where there is potential threat from human activity.

The nominated properties are located in the coastal area of Yancheng Municipality, east Jiangsu Province, in the south of Yellow Sea Ecoregion. The areas are mostly covered by two National Nature Reserves: Jiangsu Yancheng

National Nature Reserve and Jiangsu Dafeng National Nature Reserve. The boundaries are determined according to the integrity of heritage value and the natural geographical attributes.

The nominated properties include two component parts:

Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1):

The north boundary starts from Zhugangzha, extends towards east to the north boundary of Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve. The west boundary starts from Zhugangzha, extends towards south along the boundary of reclamation area to Chuandonggang, turns west for 2.18 km, turns southwest to Dongchuan sea dyke, extends along the Chuanxin Road for 2.75 km, reaches the north boundary of reclamation area and turns to south to the north boundary of Tiaozini reclamation area. The south boundary starts from Liangduozha, extends towards east along the planned Tiaozini embankment to the south boundary of Dongsha Experimental Zone. The east boundary coincides with the east boundary of Dongsha Experiment Zone.

The Middle Section of Jiangsu Yancheng National Nature Reserve (YS-2):

The North boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards east for 5 km. The west boundary starts at the location 1.7 km south from Sheyang River estuary, extends towards southeast along the boundary of reclamation area to Xinyanggang estuary and reaches the north boundary of the core area of Yancheng Wetland Rare Birds National Nature Reserve. From the south bank of Xinyang Harbor, the west boundary extends 1943 m southwards, turns towards 405 m east of the sea dyke, extends

southwards parallel to the sea dyke until the boundary of Dafeng County, extends 100 m southwards to the north bank of Doulong Harbor, then eastwards along the bank until the -3m isobath, and turns southward towards the parallel line 3 km south of the eastward extension of Simaoyou River. The south boundary is the parallel line 3 km south of the eastward extension of Simaoyou River, extending eastwards until 5km offshore. The east boundary is the -3m isobath, which marks the boundary of intertidal zone.

The buffer zones surround the nominated properties from the west, providing buffer and extra protection. The boundaries of the buffer zones are also determined considering the continuity of natural components, landscapes and human activities.

On the east of both components of the nominated property are subtidal mudflats, where there is no fixed artificial facility. The extremely complicated hydrological condition provides natural barriers for the nominated property, preventing large ships from approaching. So the buffer zones are established on the west (land side) of the nominated property.

(2) The property is of adequate size to ensure the complete representation of the features and processes which convey the property's significance.

The nominated property extends eastwards from the edge of the area of human activity (townships, farmlands, fish ponds), covering a series of undisturbed coastal habitat types, including subtropical-warm temperate transitional evergreen/deciduous mixed broad-leaved secondary forest, Imperata cylindrical grassland, reed marsh, Suaeda glauca marsh, Spartina alterniflora marsh, mudflats with no vegetation, tidal channels and shallow sea. The coherent landscape spectrum shows comprehensively the evolution

of landforms and ecosystems related to landscape changes and hydrological processes.

From the sea side to the land side, the transition types are: mudflat with no vegetation, Spartina alterniflora marsh, Suaeda glauca marsh, Aeluropus sinensis grassland, Imperata cylindrical grassland or reed marsh. On the most salty mudflats with no vegetation live the most abundant benthic animals, which provide rich food resources for migrating birds.

Secondary forests, Imperata cylindrical grasslands and reed marshes are major habitats for Pere David’s deer, water deer and reed parrotbill. Reed marshes and Suaeda glauca marshes are major habitats for red-crowned crane and geese and ducks. Mudflats with no vegetation are habitats for numerous waders and gulls. The ranges of red-crowned crane and Pere David’s deer in this region are mostly within YS-1, YS-2 and their buffer zones.

The nominated properties and buffer zones add up to over 220,000 hectares, ensuring the the continuity of ecological functions, so that the ecological processes in the intertidal zone can happen without restriction. Sufficient area, high quality mudflats and undisturbed natural ecosystems provide good stopovers and ample space for migratory birds.

At present, the nominated properties and buffer zones are located within Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve, both strictly protected by the laws of China. The official Ecological Red Lines also provide adequate protection. These management and protection policies can ensure that the region remains undisturbed, maintaining intact ecosystems and ecological processes.

The nominated properties include the core areas and intertidal wetlands in the

two reserves, as well as the Dongsha district, while the buffer zones and experimental zones of the two reserves surround the west side (land side) of the nominated property, providing adequate buffer and protection from the inland direction. The nominated properties and buffer zones satisfy the species' current need of space.

3.1.d Requirements for protection and management

The nominated properties and buffer zones are all located within the Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve. The nominated properties are all state-owned, protected by laws and regulations such as the Constitution of the People's Republic of China, the Forest Law of the People's Republic of China, the Environmental Protection Law of the People's Republic of China, The law on the protection of wild animals of the People's Republic of China, the Regulations of the People's Republic of China on Nature Reserves, Marine Environment Protection Law of the People's Republic of China, Regulations for the implementation of the protection of wild plants in People's Republic of China,Management approach of Jiangsu Yancheng National Nature Reserve, Regulations on the protection of wetlands in Jiangsu. The legal system guarantees the Institutionalized legal protection for the OUVs of nominated properties.

Jiangsu Yancheng National Nature Reserve was enlisted as a Human and Biosphere of the UNESCO member in 1992, as a member of Northeast Asia crane protection area network in 1996, as a Ramsar site in 2002 together with Dafeng National Nature Reserve. The provincial government pays great concern to the world heritage nomination and biodiversity conservation. In the 13th Five-year Plan of Jiangsu, the nomination of world heritage in the Yellow

Sea coast and increase of biodiversity are highlighted.

On the other hand, management bureaus had been established in the nominated property. Conservation measures and plans had been implemented. The cooperation mechanism among government, institutions, and communities has been established with sufficient staff and financial supports. There are 185 full-time staffs in the nominated property, who take in charge of safeguard, law enforcement, research, monitor, tourism and education. Many institutions, e.g. Nanjing University, Nanjing Forestry University, Fudan University, Beijing Forestry University, and Chinese Academy of Science, had launched various research programs on wetland ecosystem services, land form of tidal flats, carbon cycles, bird migration, and natural history of flagship species.

The management plans for the nominated properties had been accomplished.

In the future, we will continue to strengthen the protection and management of the nominated properties in the following aspects:

1) Strengthen the monitoring and research of the elements with OUVs, including landscapes and biological elements, in order to implement adaptive management. 2) Monitor and study the threats, and carry out targeted prevention, control or remediation measures; 3) involving enterprises and residents in the nominated properties and buffer zones in the management, monitoring and public education actions, and continue to promote public participation and concern in the protection work; 4) improve the interpretation system, control the number of tourists and enhance the ecological education for tourists; regulate access to tourist areas, strengthen supervision and keep the impact of tourism and transportation on the minimal level; 5) establish a unified administration office to lead the management of the nominated properties and buffer zones (Yancheng Municipal People's Government of

Jiangsu Province has approved the establishment of World Heritage Application and Management Office Yancheng Municipality); 6) enhance the protection and management of the nominated properties and buffer zones by integrating the administrative forces of the two nature reserves; 7) use the technical support from the expert group for Yancheng World Heritage nomination, local authorities, monitoring and research institutions, and universities, who will be responsible for the monitoring, protection and management of the nominated properties; 8) promote local legislation to protect the nominated properties and formulate the "Regulations for the Protection of Yancheng's World Heritage Nominated Property”.

3.2 Comparative Analysis

3.2.a Aspects for comparative analysis

The Yellow Sea and Bohai Gulf coast contain the world’s largest intertidal mudflat, a key node of the East Asian-Australasian Flyway. The East Asian-Australasian Flyway, among all the main flyways, is used by the largest number of migratory bird species, as well as the largest number of threatened species. Large rivers (Yellow River, Yangtze River, Yalu River, Liao River, Luan River, Hai River etc.) continuously discharge sediments into Yellow Sea and Bohai Gulf, accumulating to form a series of different habitat types such as mudflats, beaches, and marshes, providing habitats for various migratory birds. These globally important habitats maintain the amazing bird biodiversity on the East Asian-Australasian Flyway.

TheMigratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) meet the Criteria (ix) and (x) for selection of World Heritage sites. On the flyway used by the largest number of migratory bird species and the largest number of threatened species, a large number of

endangered species are concentrated in certain seasons in the relatively limited space of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China. Moreover, a large proportion of the populations of many endangered species aggregate in several certain sites, giving these sanctuaries globally outstanding value in terms of research and conservation. Considering Criterion (x), the nominated property will be compared with several existing World Heritage sites on the East Asia-Australasian Flyway, which also feature the outstanding universal value of migratory bird sanctuaries.

The landscapes and ecological processes along the Yellow Sea-Bohai Gulf coast are shaped by two interacting processes: accumulation of the sediment discharge from rivers in east China, and subsidence of the East Asian continental shelf. Large rivers such as the Yellow River, the Yangtze River and the Huai River, meandering over vast alluvial plain, bring fertile silt and muddy water into the shallow basin of the Yellow Sea. The natural process of sea level change and subsidence has formed more than 3 million hectares of the world's largest radial sand ridges. The radial sand ridges are worldwide unique coastal landscapes, consisting of estuary deltas formed in different eras since Pleistocene and shaped by the geological structure, estuary deposition and tidal hydrological conditions. This is the main element supporting Criterion (ix), in terms of which the nominated property can be compared with various types of coastal World Heritage sites. The nominated property is not only a key habitat for a large number of endangered species, but also represents the typical characteristics of coastal and marine ecosystems. Changes in its wetland landscape patterns also reflect the evolution of flora and fauna in coastal and marine ecosystems. Its ecosystem services also fully reflect the ecological and physiological processes in the development of communities within its ecosystem. They can be described as

outstanding, irreplaceable examples of coastal and marine ecosystems in the world. A detailed comparative analysis is as follows.

3.2.b Comparison with other coastal World Natural Heritage sites or nominated properties on the East Asian-Australasian Flyway (considering Criterion (x))

The East Asian-Australasian Flyway starts from Alaska and east Siberian tundra in the Arctic Circle, extending southwards to Ganges Delta, Southeast Asian islands, Australia and New Zealand. Within this vast range lie a series of migratory bird habitats of coastal wetlands, distributed in 13 World Heritage sites including Kluane / Wrangell-St. Elias / Glacier Bay / Tatshenshini-Alsek (Canada and the United States), Shiretoko (Japan), Ha Long Bay (Vietnam), Puerto-Princesa Subterranean River National Park (Philippines), Lorentz National Park (Indonesia), Ujung Kulon National Park (Indonesia), The Sundarbans (India, Bangladesh), Ningaloo Coast (Australia), Shark Bay, Western Australia, Wet Tropics of Queensland (Australia), Great Barrier Reef (Australia), Gondwana Rainforests of Australia and Te Wahipounamu – South West New Zealand. At present, the Yellow Sea ecoregion does not have any coastal World Natural Heritage; there are only two projects on the tentative list: “The Coast of the Bohai Gulf and the Yellow Sea of China” and “Southwestern Coast Tidal Flats” in Republic of Korea. We hereby compare the sites YS-1 and YS-2 in the project Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I), based on the preparatory list of "China's Bohai Bay-Yellow Sea Coastal Zone", with the World Heritage sites above, in terms of criteria for selection and outstanding universal value related to migratory bird habitats. In addition, we compared the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf

of China (Phase I) with the Southwestern Coast Tidal Flats in Republic of Korea.

Fig. 3-2 World Heritage sites or nominated properties on the East Asian-Australasian Flyway with outstanding universal value related to migratory bird abitat

Table 3-2 Comparison of the nominated property with other World Heritage sites on the East Asian-Australasian Flyway

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
Nominated property	(ix) (x)	YS-1 N 33°0′16.14″ E 121°3′29.92″ YS-2 N 33°34′8.54″ E 120°39′1.60″	109,370 ha 43,804 ha	-	Palaearctic realm2.15.6Oriental Deciduous Forest	Threatened birds, including Baer's pochard, spoon-billed sandpiper, Siberian crane, red-crowned crane, black-faced spoonbill etc.	Key stopovers, wintering grounds and breeding grounds for numerous cranes, geese and ducks and waders
Kluane / Wrangell-St. Elias / Glacier Bay / Tatshenshini-Alsek (Canada; United States)	(vii)(viii)(ix)(x)	N 61°11′51.3″ W 140°59′31.1″	9,839,121 ha	1979、1992、1994	Nearctic Realm 1.1.2 Sitkan	non-polar icefield, world's longest and most spectacular glaciers; Tatshenshini and Alsek river valleys are linkages from coast to interior for plant and animal migration.	Important breeding grounds for waders

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
Shiretoko (Japan)	(ix)(x)	N 43°56′57.984″ E 144°57′56.988″	71,100 ha	2005	Palaearctic realm2.14.5Manchu-Japanese Mixed Forest	Blackiston's fish owl and the *Viola kitamiana* plant	Stopovers for various migratory birds; important wintering ground for Steller's sea eagle
Puerto-Princesa Subterranean River National Park (Philippines)	(vii)(x)	N 10°10′0″ E 118°55′0″	22,202 ha	1999	Indomalayan 4.26.12 Philippines	limestone karst landscapes and subterranean river; 'mountain-to-sea' ecosystem and some of the most important forests in Asia	The coastal part is a stopover site for some waders.
Lorentz National Park (Indonesia)	(viii)(ix)(x)	S 4°45′0″ E 137°49′59.988″	2,350,000 ha	1999	Indomalayan 4.2.512Bornio	continuous, intact transect from snowcap to tropical marine environment, including	The coastal part is a stopover site for some waders.

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
						extensive lowland wetlands	
Ujung Kulon National Park (Indonesia)	(vii)(x)	S 6°45′0″ E 105°19′60″	78,525 ha	1991	Indomalayan 4.21.12Java	geological interest, particularly for the study of inland volcanoes; animals including Javan rhino, leopard, wild dog (dhole), leopard cat, fishing cat etc.	The coastal part is a stopover site for some waders.
The Sundarbans (India; Bangladesh)	(ix)(x)	N 21°56′42″ E 88°53′45″	133,010 ha	1987	Indomalayan 4.3.1Bengalian Rainforest	Continuous mangrove forest; endangered tigers, aquatic mammals, birds and reptiles	The coastal part is a stopover site for some waders.

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
Ningaloo Coast (Australia)	(vii)(x)	S 22°33′45″ E 113°48′37″	705,015 ha	2011	Australian realm 6.4.6 western sclerophyll	one of the longest near-shore reefs in the world; karst system and network of underground caves and water courses; sea turtles and other rare species; rich marine biodiversity	The coastal part is wintering ground for a large number of waders.
Shark Bay, Western Australia	(vii)(viii)(ix)(x)	S 25°29′10″ E 113°26′10″	2,200,902 ha	1991	Australian realm 6.4.6 western sclerophyll	The world's largest and richest seagrass beds; dugong population; stromatolites; five species of endangered mammals	The coastal part is wintering ground for a large number of waders.
Wet Tropics of Queensland (Australia)	(vii)(viii)(ix)(x)	S 15° 39′0″ E 144°58′0″	893,453 ha	1988	Australian realm 6.1.1 Queensland Coastal	Tropical rainforests, varied array of plants, as	The coastal part is wintering ground for a

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
						well as marsupials and singing bird	large number of waders.
Great Barrier Reef (Australia)	(vii)(viii)(ix)(x)	S 18°17′10″ E 147°41′60″	34,870,000 ha	1981	Australian realm 6.1.1 Queensland Coastal	world's largest collection of coral reefs, with 400 types of coral, 1,500 species of fish and 4,000 types of mollusc	The coastal part is wintering ground for a large number of waders.
Gondwana Rainforests of Australia	(viii)(ix)(x)	S 28°15′0″ E 150°3′0″	370,000 ha	1994	Australian realm 6.6.6 Eastern Sclerophyll	shield volcanic craters and the high number of rare and threatened rainforest species	The coastal part is wintering ground for a large number of waders.
Te Wahipounamu – South West New Zealand	(vii)(viii)(ix)(x)	S 45°2′9.7″ E 167°19′10.6″	2,600,000 ha	1990	Antarctic Realm 7.1.2 Neozealandia	fjords, rocky coasts, towering cliffs, lakes and waterfalls shaped by successive glaciation; endangered birds including takahë,	The coastal part is wintering ground for a large number of waders.

Name of property	Criteria	Coordinates	Area	Year of inscription	Biogeographic realm	Major object of protection	Role on the EAAF
						kākāriki and the South Island subspecies of brown kiwi	

Table 3-3 Comparison of the nominated property with Southwestern Coast Tidal Flats, Republic of Korea

Content of comparison	Nominated property	Southwestern Coast Tidal Flats, Republic of Korea
Criteria	(ix) (x)	(viii)(ix)
Coordinates	YS-1 N 33°0′16.14″ E 121°3′29.92″ YS-2 N 33°34′8.54″ E 120°39′1.60″	Gochang Tidal Flats N 35°27′35″ E 126°26′42″ Suncheon Tidal Flats N 34°52′55″ E 127°30′48″ Muan Tidal Flats N 34°58′15″ E 126°22′37″ Buan Tidal Flats N 35°43′35″ E 126°36′16″ Boseong Tidal Flats N 34°49′48″ E 127°22′41″
Area	YS-1:109,370 ha YS-2:43,804 ha	-
Formation cause of wetlands	Mudflats, beaches and marshes are formed by the sedimentation of discharges from large rivers like Yangtze River and Yellow River under the unique hydrological conditions and historical changes in the Yellow Sea-Bohai Gulf area.	The open coastline is directly exposed to seasonal influences by monsoon: In winter, strong waves create sand flats; in summer, tidal effects are stronger than the waves, creating mudflats.
Habitat types	Mudflats, marshes, radial sand ridges	Sand flats, mudflats
Threatened species	20 threatened bird species including Baer's pochard, spoon-billed sandpiper, Siberian crane, Chinese crested-tern, Oriental stork, red-crowned crane, black-faced spoonbill, reed parrotbill etc.	The threatened species above except Oriental stork, Siberian crane and reed parrotbill
Number of bird species	415	~300

3.2.c Comparison with other coastal or delta-type World Natural Heritage sites or nominated properties (considering Criterion (ix))

In the world, apart from the properties mentioned in 3.2.b, there are another 23 World Natural Heritage sites and one nominated property with outstanding universal value related to coastal zones:

Europe, West Asia and North America (13 World Natural Heritage sites, one World Heritage nominated property): Wadden Sea (Denmark; German; Netherlands), High Coast/Kvarken Archipelago (Finland; Sweden), West Norwegian Fjords – Geirangerfjord and Nærøyfjord, Dorset and East Devon Coast (United Kingdom), Giant's Causeway and Causeway Coast (United Kingdom), Danube Delta (Romania), Ilulissat Icefjord (Denmark), Gros Morne National Park (Canada), Olympic National Park (United States), Redwood National and State Parks (United States), Islands and Protected Areas of the Gulf of California (Mexico), Whale Sanctuary of El Vizcaino (Mexico), Sian Ka'an (Mexico), and Kızılırmak Delta Wetland and Bird Sanctuary (Turkey, nominated property);

Central and South America (6): Darien National Park (Panama), Río Plátano Biosphere Reserve (Honduras), Belize Barrier Reef Reserve System, Area de Conservación Guanacaste (Costa Rica), Atlantic Forest South-East Reserves (Brazil) and Península Valdés (Argentina);

Africa (4): Sanganeb Marine National Park and Dungonab Bay – Mukkawar Island Marine National Park (Sudan), iSimangaliso Wetland Park (South Africa), Namib Sand Sea (Namibia) and Banc d'Arguin National Park (Mauritania).

Six of the ten coastal World Natural Heritage sites in Africa and Central and

South America (Darien National Park (Panama), Río Plátano Biosphere Reserve, Belize Barrier Reef Reserve System, Area de Conservación Guanacaste, Atlantic Forest South-East Reserves and Banc d'Arguin National Park) are tropical coastal ecosystems, including rocky shores, coral reefs, beaches and mangrove forests, without large areas of coastal plains or mudflats. On the other hand, Península Valdés is cold, barren coast, with the major objects for protection being marine mammals. Sanganeb Marine National Park and Dungonab Bay – Mukkawar Island Marine National Park, iSimangaliso Wetland Park and Namib Sand Sea show the transition of ecosystems from savanna or desert to ocean, represented by sandy coastal landscapes.

Six of the World Natural Heritages in Europe and North America (High Coast/Kvarken Archipelago, West Norwegian Fjords – Geirangerfjord and Nærøyfjord, Dorset and East Devon Coast, Giant's Causeway and Causeway Coast, Ilulissat Icefjord, and Gros Morne National Park) were nominated under criterion (viii), showing fossils, lava movements or Quaternary glacial relics left on the coast by tectonic activities.

Olympic National Park, and Redwood National and State Parks, both in United States, embody the basin ecosystems and landscapes composed of mountain forests, rivers and ocean, protecting unique and threatened species in this environment. In Mexico, Islands and Protected Areas of the Gulf of California and the Whale Sanctuary of El Vizcaino (Mexico) protect the steep shores, deep bays and threatened species inhabiting the Gulf of California, especially multiple species of large whales. Sian Ka'an features complex forms of limestone coasts, and vegetation types such as tropical forests and mangroves, and the biodiversity depending on them. The above Heritage sites are all rocky shores, rather than open, flat marine deposition plains and

beaches.

In summary, only two Heritage sites (Wadden Sea and Danube Delta) and one nominated property (Kızılırmak Delta) contain landscapes and habitats comparable to the nominated property on Yancheng Yellow Sea coast: marine deposition plains, vast tidal flats or deltas of large rivers. They are compared in the following table:

Table 3-4 Comparison of the nominated property with other coastal and delta-type World Heritage sites

Content of comparison	Nominated property	Wadden Sea	Danube Delta	Kızılırmak Delta
Criteria	(ix) (x)	(viii)(ix)(x)	(vii)(x)	(vii)(x)
Coordinates	YS-1 N33°0′16.14″ E121°3′29.92″ YS-2 N33°34′8.54″ E120°39′1.60″	N53°31′43″ E8°33′22″	N45°4′59.988″ E29°30′0″	N41°40′E36°05′
Area	YS-1:109,370 ha YS-2:43,804 ha	1145609ha	312,440 ha	56.000 ha.
Year of inscription	-	2009、2014	1991	-
Biogeographic realm	Palaearctic realm2.15.6Oriental Deciduous Forest	Palaearctic realm2.9.5 Atlantic	Palaearctic realm 2.29.11 Pontian steppe	Palaearctic realm 2.17.7Mediterranean Sclerophyll
Number of plant species	324	900	-	561
Number of bird species	415	106	300	352
Major object of protection	20 threatened bird species including Baer's pochard, spoon-billed sandpiper, Siberian	largest unbroken system of intertidal sand	River basin and delta of Europe's second longest river	The most important wetland ecosystem in the south Black Sea basin.

Content of comparison	Nominated property	Wadden Sea	Danube Delta	Kızılırmak Delta
	crane, Chinese crested-tern, Oriental stork, red-crowned crane, black-faced spoonbill, reed parrotbill etc.	and mud flats in the world		
Formation cause of wetlands	Mudflats, beaches and marshes are formed by the sedimentation of discharges from large rivers like Yangtze River and Yellow River under the unique hydrological conditions and historical changes in the Yellow Sea-Bohai Gulf area.	The sand and mud flats are formed via the unique tidal effect; the effect of river discharge is weak.	Single modern river delta	Single modern river delta

3.2.d Comparison with inland, wetland-type World Natural Heritage sites or nominated properties on the East Asian-Australasian Flyway (integrating Criteria (ix) and (x))

In inland regions, there are also World Natural Heritage sites as important inland migratory bird sanctuaries on the East Asian-Australasian Flyway, such as Landscapes of Dauria (Mongolia; Russian Federation), Uvs Nuur Basin (Mongolia; Russian Federation) and Kaziranga National Park (India). They are compared with the nominated property in the following table:

Table 3-5 Comparison of the nominated property with inland, wetland-type World Natural Heritage sites on the East Asian-Australasian Flyway

Name of property	Nominate property	Landscapes of Dauria	Uvs Nuur Basin	Kaziranga National Park
Country	China	Mongolia; Russian Federation	Mongolia; Russian Federation	India
Criteria	(ix) (x)	(ix)(x)	(ix)(x)	(ix)(x)
Coordinates	YS-1 N 33°0′16.14″ E 121°3′29.92″ YS-2 N 33°34′8.54″ E 120°39′1.60″	N 49°55′48.8″ E 115°25′31.6″	N 50°16′30″ E 92°4′11″	N 26°40′0″ E 93°25′0″
Area	YS-1:109,370 ha YS-2:43,804 ha	912,624 ha	898,063.5 ha	42,996 ha
Year of inscription	-	2017	2003	1985
Biogeographic realm	Palaearctic realm2.15.6Oriental Deciduous Forest	Palaearctic realm 2.30.11 Mongolia-Machurian Steppe	Palaearctic realm 2.30.11 Mongolia-Machurian Steppe	Indomalayan Realm4.9.4 Burma Monsoon Forest
Number of plant species	324	-	-	-
Number of bird species	415	-	359	-

Name of property	Nominate property	Landscapes of Dauria	Uvs Nuur Basin	Kaziranga National Park
Major object of protection	20 threatened bird species including Baer's pochard, spoon-billed sandpiper, Siberian crane, Chinese crested-tern, Oriental stork, red-crowned crane, black-faced spoonbill, reed parrotbill etc.	Dauria steppe ecosystem; threatened birds and migratory birds including white-naped crane, and great bustard mammals including Mongolian Marmots and Pallas Cats	Pleistocene ice sheets and numerous glacial lakes; important habitats for migratory birds, waterbirds and seabirds; rare animals in the deserts like gerbil, jerboas and the marbled polecat; globally endangered snow leopard, mountain sheep (argali) and the Asiatic ibex in the mountains	one of the last areas in eastern India undisturbed by a human presence; the world's largest population of one-horned rhinoceroses, as well as many mammals, including tigers, elephants, panthers and bears, and thousands of birds
Role on the EAAF	Important breeding grounds, wintering grounds and stopovers for cranes, geese and ducks, and waders	Important breeding grounds and stopovers for cranes, geese and ducks, and waders	Stopovers for waders, gulls, geese and ducks	Stopovers for various migratory birds

3.2.e Summary of uniqueness

In summary of the comparative analyses, the nominated properties Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) have the following globally unique value:

Firstly, the nominated properties are at the center of the East-Asian Australasian Flyway, providing major stopovers, breeding grounds or wintering grounds for the largest number of threatened migratory bird species,

especially endangered or critically endangered species. However, this region is still a gap in the World Heritage list, despite the existence of large areas of World Natural Heritage sites on the north, south and westernmost parts of the flyway (east South Asia, for example the Sundarbans in Bangladesh).

Secondly, compared with the other nominated property in the Yellow Sea ecoregion, the Southwestern Coast Tidal Flats in Korea, the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) have been formed in different historical periods by large river discharge, unique ocean hydrological conditions, and continuous tectonic subsidence of the East Asian continental shelf. The alluvial plains, delta plains, marine deposition plains, mudflats and radial sand ridges have been shaped by different geological and ecological processes, leading to difference in the ecosystems and the biodiversity they can maintain.

Thirdly, in terms of the landforms of marine deposition plains, delta plains or tidal flats, only a few heritage sites or nominated properties in the world are comparable to the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I), including the Wadden Sea, the Danube Delta, the Kızılırmak Delta and the Southwestern Coast Tidal Flats in Korea. However, they are quite different in terms of causes, scale and conservation value for endangered species.

In summary, the nominated properties in the Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) have indispensable outstanding value for the conservation of endangered migratory birds. Their landscapes and ecosystems are also globally significant as examples of coastal landscapes and ecosystem evolution

3.3 Proposed Statement of Outstanding Universal Value

3.3.a Brief synthesis

The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a serial world natural heritage nominated property consisting of natural wetland habitats such as deltas, sandbanks, mudflats, saltwater/freshwater marshes, rocky shores, islands and ancient coastlines, as well as salt pans, fish ponds and rice paddies.

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China contains the world's largest continuous mudflat seashore. Sediments and nutrients are continuously discharged from the Yellow River and Yangtze River (they are among the world's longest ten rivers) and other rivers including Yalu River, Liao River, Luan River and Hai River, accumulating to form fertile mudflats, radial sand ridges and sandbanks. Thanks to the diversity of sediment properties, hydrological conditions and landforms, the migratory bird habitats along the coast also include massive sand dunes, lagoons, rocky shores, and islands where threatened birds aggregate to breed. Nowadays, the dynamic process of river sediment discharge and continental shelf subsidence continues to shape the geological landscape and ecosystem on the Bohai Gulf-Yellow Sea coast, making it one of the most diverse and fertile coasts in the world, providing key habitats for migratory birds on the East Asian-Australasian Flyway.

The serial nomination sites are key stopovers, wintering grounds or breeding grounds for some of the world's most noticed threatened bird species, including three critically endangered water birds: the Chinese crested-tern (*Thalasseus bernsteini*) with the global population just more than a hundred, and the spoon-billed sandpiper (*Eurynorhynchus pygmeus*) and the Baer's

pochard (*Aythya baeri*), with only hundreds of individuals left in the world. Almost all individuals of the Nordmann's greenshank (*Tringa guttifer*), the great knot (*Calidris tenuirostris*), and the Far Eastern curlew (*Numenius madagascariensis*) depend on these habitats.

The East Asian-Australasian Flyway Partnership assessed the importance of 1030 reserves and migratory bird habitats on the flyway. The results showed that the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast, and are thus suitable for the first phase of the nominated property. The serial nomination sites Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) involve two components: 1) Jiangsu Dafeng National Nature Reserve, and the southern section and the Dongsha experimental zone of Jiangsu Yancheng National Nature Reserve (YS-1) in Jiangsu Province, southwest Yellow Sea coast; and 2) the middle section of Jiangsu Yancheng National Nature Reserve (YS-2). The two nominated properties are separated by the Dafeng Port and the surrounding areas with dense human activity, with their boundaries about 30 kilometers apart.The East Asian-Australasian Flyway Partnership assessed the importance of 1030 reserves and migratory bird habitats on the flyway. The results showed that the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast, and are thus suitable for the first phase of the nominated property. The serial nomination sites Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China (Phase I) involve two areas: 1) Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1); and 2) The Middle Section of Jiangsu Yancheng National Nature (YS-2). The two nominated properties are

separated by the Dafeng Port and the surrounding areas with dense human activity, with their boundaries about 30 kilometers apart.

1. **Jiangsu Dafeng National Nature Reserve, and the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1).** The nominated property consist of two interconnecting parts in Dafeng District, Yancheng, Jiangsu: 1) The core area (on the east of Dongchuan sea dyke) of Jiangsu Dafeng National Nature Reserve located (referred to as “Dafeng”); 2) the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (referred to as “south section of Rare Bird Reserve” and “Dongsha”), and the intertidal zone and sea in between. The area of the nominated property is 109,370 ha, plus a buffer zone of 23,188 ha on the west. Jiangsu Dafeng National Nature Reserve contains typical habitat types of secondary forest on marine deposition plain and freshwater reed marsh. The south part of Rare Bird Reserve and Dongsha embody the complete ecosystems of intertidal mudflats, radial sand banks and sand ridges. Dafeng is home to the world’s largest captive population and largest reintroduced population of Père David's deer (or milu, *Elaphurus davidianus*). The south part of Rare Bird Reserve and Dongsha provide an important stopover site for the waders on the East Asian-Australasian Flyway. Half of the world’s spoon-billed sandpipers and Nordmann's greenshanks make long stopovers, feed, or even moult in the nominated property and surrounding areas.

2. **The Middle Section of Jiangsu Yancheng National Nature.** The nominated property is located in Sheyang County, Tinghu District, Dafeng District, Yancheng, Jiangsu, containing the core area in the middle section of Jiangsu Yancheng National Nature Reserve (referred to as “middle section of Rare Bird Reserve”). The area of the nominated property is 43,804 ha, plus a

buffer zone of 51,785 ha on the west. The middle section of Rare Bird Reserve mainly consist of habitat types of freshwater reed marsh and intertidal mudflat. It provides the most important wintering ground for the migratory population of red-crowned crane (*Grus japonensis*), with about 50% (in some years 80%) of individuals spending the winter here each year.

On the east of both components of the nominated property are subtidal mudflats, where there is no fixed artificial facility. The extremely complicated hydrological condition provides natural barriers for the nominated property, preventing large ships from approaching. So the buffer zones are established on the west (land side) of the nominated property.

The area involved in the two nominated properties above constitute the largest coastal wetland on the west bank of Pacific Ocean. Within the two nominated properties, large tracts of coastal habitats remain less disturbed by human activity, retaining the natural ecosystem structure and functions, becoming one of the natural coastlines rare in this country and the world. These habitats, together with other sites along the Chinese coast to be nominated in the future, form indispensable links in the conservation network for more than 20 threatened bird species on the East Asian-Australasian Flyway.

3.3.b Justification for criteria

(ix) be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;

Since the Pleistocene, great rivers such as the Yellow River and the Yangtze

River have been endlessly flowing into the Yellow Sea and the Bohai Gulf, carrying massive material from the Qinghai-Tibet Plateau and the Central Asian desert. On the other hand, the continental shelf in Yellow Sea and Bohai Gulf have been in the process of continuous subsidence. Accumulation of river sediment discharge and tectonic subsidence, combined with marine hydrological processes and climate change, have jointly shaped the natural landscape along the Yellow Sea and Bohai Gulf coast, forming the basis for the occurrence and evolution of ecosystems.

Coastal plain in the nominated properties have been developed by marine deposition. Large rivers discharge into the southern Yellow Sea a large amount of sediments, which are then suspended and transported by tides and waves to be deposited in the intertidal zone. Meanwhile, the coastal plain continuously silts up, advancing to the sea, forming unique intertidal mudflats. Due to the tidal asymmetry (fast flood tides and slow ebb tides), the sediments transported by tides can be accumulated in the intertidal zone. With the effect of radial currents, radial sand ridges and tidal creek system developed by the movement of mud and sand. With the intense effect of tides and waves, the sand ridges grow and decline, in a tendency of accumulation and increase, and move towards the coast. Therefore, the sand banks in the middle of the radial sand ridges or closed to the coast are silting up. These processes resulted in the largest radial sand ridge system in the world, with the size over 30,000 km2. The dynamic changes of these landscapes driven by changes of river and marine hydrology and climate have become the major driving forces of the evolution of ecosystems and even species.

The vegetation zones in the nominated area shows remarkable zonation characteristics of coastal wetland vegetation: with changes of soil salinity and seawater submergence, the vegetation structure in the nominated area shows

obvious transition and clear succession. From the sea side to the land side, the transition types are: mudflat with no vegetation, *Spartina alterniflora* marsh, *Suaeda glauca* marsh, *Aeluropus sinensis* grassland, *Imperata cylindrical* grassland or reed marsh. The spatial distribution of habitat types and vegetation communities change with the dynamic changes of the muddy shore, forming the basis for the maintenance of biodiversity.

These two nominated properties not only represent the typical characteristics of the coastal and marine ecosystems and their changes in landscape pattern, but also highlight the evolution of their plant communities against the background of the dynamic changes in coastal landscape. At the same time, their ecosystem supporting services also fully reflect the ecological and physiological processes in various organisms related to adaptation and evolution, making the area an outstanding example of coastal and marine ecosystems.

(x) contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or conservation.

The nominated properties are located in the south of Yellow Sea Ecoregion (#203 in the WWF Global 200 Ecoregions), containing the world's largest continuous mudflat seashore, already listed as important wetlands in the Ramsar Convention. As one of the best preserved intertidal mudflats, Jiangsu Yancheng National Nature Reserve has joined UNESCO's Man and Biosphere reserves network. The area features rich biodiversity, providing key stopovers, breeding grounds and wintering grounds for millions of migrating waterbirds on the East Asian-Australasian Flyway. The *IUCN situation*

analysis on East and Southeast Asian intertidal habitats reveals 16 key areas for water birds along the flyway, while 7 of them are located in the Yellow Sea-Bohai Gulf region, and the nominated properties constitute the largest and most important key area among them. According to the assessment by East Asian-Australasian Flyway Partnership on the importance of 1030 reserves and migratory bird habitats on the flyway, the coastal wetlands in Yancheng rank top on the list of the important migratory bird habitats along the Bohai Gulf-Yellow Sea coast. The nominated properties provide important habitats for the critically endangered species Baer's pochard, Siberian white crane, and spoon-billed sandpiper, and one of the important breeding and wintering grounds for the vulnerable species Saunders's gull (*Larus saundersi*). They also provide the most important wintering ground for the migratory population of red-crowned crane (*Grus japonensis*), with about 50% (in some years 80%) of individuals spending the winter here each year. In addition, the nominated properties provide natural habitats for the Pere David's deer, a species once extinct in the wild, within its historical range. It is currently home to more than two-thirds of the global population of wild Père David's deer, providing a model for reintroduction and rewilding of large mammals after extinction in the wild.

3.3.c Statement of integrity

The Migratory Bird Sanctuaries along the Coast of Yellow Sea and Bohai Gulf of China involve large tracts of mudflats, beaches and other habitats connected to them through the migration of birds, consisting the largest coastal migratory bird habitat system, serving as key stopovers for bird migration between the two hemispheres and an important part of the East Asian-Australasian Flyway. The vast space provide high quality rest stops for more than a hundred species and millions individuals of migratory waterbirds,

to replenish the fat they need for the continued flight.

The first phase of the serial nomination include all the intertidal wetlands undisturbed by human activity, including two existing nature reserves, especially the radial sand ridges covered by the reserves. The nominated properties adequately reflect and protect all kinds of natural, dynamic elements of the intertidal wetlands. The area presents a coherent landscape spectrum, from wetlands on the land side to radial sand ridges, showing comprehensively the evolution of landforms and habitats related to tidal processes.

Yancheng wetlands on the Yellow Sea coast feature unique, complete intertidal mudflats in fresh water, brackish water and salt water zones. The nominated property (Phase I) and buffer zone area of more than 220,000 hectares will ensure the continuity of ecological functions, and the ecological processes in the intertidal zone can happen without restriction. Sufficient area, high quality mudflats and undisturbed natural ecosystems provide good stopovers and ample space for migratory birds.

Among them, Jiangsu Dafeng National Nature Reserve, the Southern Section and Dongsha Experimental Zone of Jiangsu Yancheng National Nature Reserve (YS-1) contains sandbanks, sand ridges, tidal channels and sea areas located in radial sand ridges, providing an important feeding ground for waders during low tides. The area also contains a series of habitat types from coastal mudflats to inland wetlands, providing resting areas for waders during high tides. The inland section includes the main range of Père David's deers and their all suitable types of habitats.

The Middle Section of Jiangsu Yancheng National Nature (YS-2) is the area with the highest concentration of red-crowned cranes, as well as a habitat

favoured by other cranes, geese and ducks. The current nominated area contains all high quality habitats and all types of feeding and resting habitats for red-crowned cranes.

At present, the nominated properties and buffer zones are mainly located within Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve, both strictly protected by the laws of China. The official Ecological Red Lines also provide adequate protection. These management and protection policies can ensure that the region remains undisturbed, maintaining intact ecosystems and ecological processes.

The nominated properties include the core areas and intertidal wetlands in the two reserves, as well as the Dongsha district, while the buffer zones and experimental zones of the two reserves surround the west side (land side) of the nominated area, providing adequate buffer and protection from the inland direction. At the same time, the ongoing sustainable management of farmland, fish ponds and salt works in the buffer zone also provided a space for the diffusion and movement of threatened species such as the red-crowned crane and the Père David's deer.

3.3.d Requirements for protection and management

The nominated properties are all state-owned, with the status of national nature reserves. A multi-level management system has been established from the state to the local areas, forming a mechanism for collaborative protection between government agencies and communities, social organizations and research institutes, with staff and funding guaranteed. Under the strict protection by the laws and regulations of the country and the local government, the natural status of coastal intertidal wetlands has been effectively maintained through the cooperation between government agencies, communities and social organizations, ensuring the survival and reproduction of the species,

providing stopovers for migratory birds. At both national and provincial levels, the government has paid great attention to the protection and management of World Natural Heritage sites. The Outline for the 13th Five-Year Plan of Jiangsu Province clearly states, "We will support the Dafeng and Yancheng National Nature Reserves to be nominated for the World Natural Heritage List, and ensure that the ecological diversity of the key regional watershed improves steadily."

In the future, we will continue to strengthen the protection and management of the nominated properties in the following aspects:

1) Strengthen the monitoring and research of the elements with natural heritage values, including landscapes and biological elements, in order to implement adaptive management. 2) Monitor and study the threats, and carry out targeted prevention, control or remediation measures; 3) involving enterprises and residents in the nominated properties and buffer zones in the management, monitoring and public education actions, and continue to promote public participation and concern in the protection work; 4) improve the interpretation system, control the number of tourists and enhance the ecological education for tourists; regulate access to tourist areas, strengthen supervision and keep the impact of tourism and transportation on the minimal level; 5) establish a unified administration office to lead the management of the nominated properties and buffer zones (Yancheng Municipal People's Government of Jiangsu Province has approved the establishment of World Heritage Application and Management Office Yancheng Municipality); 6) enhance the protection and management of the nominated properties and buffer zones by integrating the administrative forces of the two nature reserves; 7) use the technical support from the expert group for Yancheng World Heritage nomination, local authorities, monitoring and research

institutions, and universities, who will be responsible for the monitoring, protection and management of the nominated properties; 8) promote local legislation to protect the nominated properties and formulate the "Regulations for the Protection of Yancheng's World Heritage Nominated Property”.

4. State of Conservation and factors affecting the Property

4.a Present state of conservation

4.a-1 Natural conditions

The two components of the nominated properties, YS-1 and YS-2, are less than 30km apart, with similar conditions of geology, topography, climate, hydrology and soils. So these aspects will be introduced as a whole in the following paragraphs.

The genus of the nominated properties belongs to the warm temperate deciduous broad-leaved forest and the subtropical evergreen broad-leaved forest in the Chinese vegetation zone, which are mainly divided into two sub-regions: namely the warm temperate southern sub-zone, the subtropical evergreen and broad-leaved mixed forest zone. China-Japan forest plant sub-region belongs to the Pan-Arctic plant area in the geographical area of the plant.

The nominated properties provide wildlife with unique habitat and living environment, unique vegetation types and rich biological species with a more complete ecosystem. According to the Global Habitat Classification System in IUCN/SSC, five of the first-level habitats are nominated for inscription on heritage. The vegetation types distributed in the nominated properties are mainly coastal seawater vegetation, saline marsh vegetation, brackish water vegetation, saline soil aquatic vegetation, coastal sandy vegetation, and these types of vegetation form the basis of ecosystem. The salinity of salted soil from the east to the west decreases from the seashore to the inland, and the distribution of saline soil communities, from the sea to the land in the direction

of the transition are as follows: un-vegetated bare beach, *Spartina* marsh, *suaeda* marsh, *Aeluropus littoralis* marsh, *Imperata* or *reed* marsh, and according to its salt tolerance, from strong to weak, these species distributions form a specific ecological sequence.

The geographical distribution of plant flora in the nominated properties is mainly the world-wide distribution genus, followed by the distribution of tropics and the distribution of the northern temperate zone. There are obvious characteristics of the transition from pan-tropical zone to temperate zone in the distribution area of the families and genus. The genus 217 belongs to 13 distribution areas. Among them, 47 are pantropical genus, 43 are distributed in the world, 43 are the north temperate zone genera, 25 in the old world temperate, 13 disjuncted types of species in the East Asia and North America, 12 in the East Asian distribution, 7 in Mediterranean, west to central Asia, 6 in the tropical Asia, 5 in the temperate Asia, 4 in the old world tropical, 3 in tropical Asia to tropical Australasia Oceania, 3 in tropical Asia to tropical Africa, and 2 in tropical & subtropical East. Asia & (S.) tropical America disjuncted.

Yancheng Yellow Sea Wetlands are located in the eastern deciduous forest biological geography province of the Palearctic realm of the world biogeography. In the Chinese animal geography, Yancheng Yellow Sea Wetlands belong to Huazhong district of China's seven major animal geographies.

There are 680 species of vertebrates, including 6 orders 12 families and 26 species of mammals, of which is 1 species of protected animals at the national level I, 1 species of national protected level II. Reptiles have 3 orders 6 families and 14 species. Amphibians include 1 order, 4 families and 9 species, of which have the national II protection animals 1 species. Fishes

have 29 orders 83 families and 216 species. Birds include 19 order 53 families and 415 species. According to the IUCN list of endangered species, there are 3 critically endangered species (CR), 8 of endangered species (EN), 12 of vulnerable species (VU), and a total of 23 species. There are many species of birds that are protected and are threatened, which indicate that the surrounding environment and the significance of birds are special and important in the nominated properties.

In the areas of environmental monitoring, the relevant basic data on the nominated properties are described in more detail in the text 2.a "Heritage description" and 6.c "Past monitoring results", as described in Annex 4 "List of properties". In general, the nominated properties highlight the outstanding universal values, so that ecosystems, endangered species and habitats, aesthetic landscapes, species trends, and natural environment of the nominated properties is well maintained.

4.a-2Threats to the outstanding universal values and protection measures

4.a-2-1Coastal ecosystems and flora and fauna community evolution and development process

(1) Threats and challenges

Reclamation: Due to the high salinity, the new reclamation flats cannot be directly planted. In the early stage, the breeding industry was developed, which resulted in the transformation of a wetland ecosystem composed of a variety of habitat types into a single fish pond and shrimp pond. There is a great deal of damage to the habitat of the shorebirds, especially waders.

(2) Protection and management policies and measures

The ecological red line has been designated to prohibit reclamation beach wetlands, and the mechanism of ecological compensation has started to establish ecological zones.

4.a-2-2 Biodiversity value

(1)Threats and challenges

Invasive alien species. In 1983, *Spartina alterniflora Loisel*, which is used as a beach guard and forage crop in China, had grown in some of the flats in the protected areas, showing an increasing trend in area. The areas of important bird habitats such as red-crowned cranes and black-headed gulls have decreasing trends that have threatened the local biodiversity resources.

(2) Protection and management policies and measures

The policies and measures includes the develoment of international cooperation, the introduction of foreign technology and inter-sprinkle grass governance.

4.a-2-3 The threaten factors regulation and the protection measures

In terms of laws, the nominated properties belong to the national and provincial protected areas and is protected by national laws and regulations. Yellow Sea Wetlands of Yancheng was protected by laws and regulations such as the Constitution of the People's Republic of China, the Forest Law of the People's Republic of China, the Environmental Protection Law of the People's Republic of China, Marine Environment Protection Law of the People's Republic of China and the Regulations of the People's Republic of China on Nature Reserves.

The nominated properties have established a sound management system and management organizations, with adequate staff and financial guarantee. The nominated properties have established four management levels: national,

provincial, prefecture and heritage nomination. To exercise the government's management authority and functions of the natural heritage resources, the Nature Reserve Authority Offices of the nominated properties have been built up and effectively implements a unified management for protection of nominated properties and human, material and financial resources management.

The nominated properties have prepared a conservation management plan, delineated clear field boundaries and established a corresponding monitoring system. The nominated properties have prepared the protection documents of "Master Plan of Yancheng National Nature Reserve (2008-2020)", "Yancheng Wetland National Reserve Five Years Construction Management Plan in Jiangsu (2012-2017)" and "Master Plan of Jiangsu Dafeng National Nature Reserve (2013-2022)", designated delineation of the scope of protection and made clear, standard pile circles. In order to further strengthen the strict protection and rational utilization of nominated properties, the nominated properties have also determined the overall goal of protecting nominated properties management, and the divisions of reasonable protection zones. For implementation of classification based on the importance of the protection of heritage value, the nominated properties have put forward the protection and management measures in detail, and established a monitoring system for the corresponding, heritage’s biodiversity and habitat, ecosystem and community ecology process, environmental quality, natural disasters and tourists. Also the nominated properties have made long-term dynamic monitoring, and the establishment of the heritage monitoring archives.

Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve are the body of the world nominated properties management authority at local sites. The Ministry of Environmental Protection, the State

Forestry Administration, Environmental Protection Department of Jiangsu Province and Forestry Bureau of Jiangsu Province have implemented guidance to the two nature reserve administration institutes. At the same time, Ting Lake District, Dafeng District, Sheyang County and Dongtai City in Yancheng City have implemented territorial protection administration of the two protected areas. In recent years, the protected areas and all levels of government and relevant departments have followed the "protection first, use late; planning first, and then development" principle, adhered to the unity of ecological, economic and social benefits, and the road of sustainable development. By strengthening the legal system construction and scientific management, people's legal concepts have been increased and improved in law enforcement efforts. At the same time, the two protected areas resolutely cracked down on the destruction of the ecological environment and the protection of biological diversity, and gradually formed a favorable atmosphere conducive to biodiversity conservation. Therefore, the red-crowned crane, other rare species and protected areas of biodiversity have been effectively protected and a successful example of the world's ecologists as birds of the "Kingdom", a model of ecological protection and biodiversity conservation have been provided in China's protected areas.

Since the establishment of the two protected area management organizations, it has gradually established a complete set of measures to combat illegal hunting and protect the patrol system. In addition, the management organizations actively promote the protection of the public through the protection of birds stop, rescue the injured wild animals, joint protection between the police and public, community protection publicity, volunteer participation and other protection activities to enhance the level of protection and the public awareness of protection, so that the natural heritage of the nominated properties have become a model of domestic nature conservation.

4.a-3 Monitoring indicators and statistical standards

According to the characteristics of the nominated properties, selecting appropriate monitoring indicators can improve the monitoring index system where includes seven categories of sub-ecological, environmental conditions, geological topography, seismic activity, tourism activities, illegal activities, community status monitoring.

1. Biological ecology monitoring: Adopted fixed sample (with) the monitoring and tracking method, the distribution and number of special vegetation community, and the population dynamics, habitat conditions, scale, the source epidemic situation of red-crowned cranes, crane, Oriental white stork, black stork, black-faced spoonbill, Spoon-billed Sandpiper, Pere David's Deer and other protected species on a regular basis;

2. Environmental monitoring: Adopted automatic equipment positioning monitoring methods, the meteorological conditions, surface water quality and quantity of water, groundwater quality water level, coastal erosion, soil physical and chemical properties are made for a long-term monitoring plan in the nominated properties;

3. Geological and geomorphological monitoring: Adopted automatic equipment positioning monitoring methods, periodic monitoring the key geological features of the stratified standard, base rock standard, GPS standard stone, ground fissure monitoring status are made for a long-term monitoring plan in the nominated properties;

4. Seismic activity monitoring: Adopted automatic equipment location monitoring methods, real-time monitoring of precursory activities, shocks and post-earthquake activities are made for key seismic activity areas;

5. Tourism activities monitoring: on the data of visitor centers, regularly

monitoring the number of visitors and tourists, road traffic conditions, the safety status of visitors, the quality of tourism facilities are made for a long-term monitoring plan in the nominated properties;

6. Illegal activities monitoring: Adopted patrols and remote sensing technology, regularly monitoring the number of indiscriminate hunting and hunting, illegal fishing are made for a long-term monitoring plan in nominated properties;

7. Community status monitoring: Adopted manual research methods, regularly monitoring residents of the settlement of the production and living conditions, construction, population changes and income levels and other indicators are made for a long-term monitoring plan in the nominated properties.

4.b Factors affecting the properties

4.b-1 Development pressure

The pressure of development within the scope of the nominated properties mainly is from industry and aquaculture.

At present, there are a number of coastal port and industrial parks, such as Sheyang Harbor and Industrial Park, Dafeng Port and Marine Economic Development Zone, which have a large number of small industrial parks and industrial parks. Concentrated and production areas and living facilities are close to the nominated properties, and coastal areas have been launched industrial projects, such as wind power, chemical enterprises, sewage seaside for the local coastal ecological environment has a serious impact. In particular, in terms of the intertidal zone along the Yancheng coast is basically flat muddy coast, the sea and ocean sea water exchange capacity is weak, and the pollutant diffusion dilution ability is poor. These have posed a great threats to ecosystem and ecological security of the nominated properties.

With the increased of fish ponds, shrimp ponds and other aquaculture area, aquaculture pollution has become a category of pollution sources cannot be ignored. According to the relevant statistics, about 30% of the fishing baits put into the pond was not eaten by fish, shrimp and crabs, which sink with the feces and other excreta of the fish and shrimp, causing the pollution of the pond. At the same time, in order to increase the number of plankton in the water, the activities of chemical fertilizers, soy milk into the pool have been applied in the ponds; in order to eliminate the dying creatures, the general application of lime, potassium permanganate, copper sulfate and other chemical substances are used for disinfection and pool cleaning. These baits, remnants, fertilizers and waste excrement, often discharged into the sea through drainage.

4.b-2 Environmental pressures

The environmental pressure of the nominated properties include land subsidence and sea level rise.

The coastline in Yancheng is long, inter-tidal zone is rich in wetland resources and the average elevation of coastal plains is about 3 m. In space, the site of the land area includes the waste Yellow River Delta plain and the central coastal sea plain, it is located in the latitude and the sea low-lying terrain condition, therefore disaster effect of making the sea level rise is particularly evident. Sea level rise will gradually drown low-lying land, flood the beach resources, increase the intensity of seawater intrusion and exacerbate coastal erosion.

4.b-3 Natural disasters and risk preparedness

Extreme weather events such as typhoons and jungle cyclones, cold waves, heavy rain, hail and tornadoes, storm surges, floods and droughts, resulting in

losses and more and more impact, the annual loss of natural disasters caused by more than 95% are derived from the weather and its derived disaster. The frequent occurrence of extreme weather events has directly caused great harm to the infrastructure, production and living in nominated properties, the buffer zones and their surrounding communities.

Migratory birds are closely related to climate. Such as the end of February to early March, the average daily temperature higher than 3 ℃, the maximum temperature rose to 10 ℃, and the red-crowned crane began to migrate north; In case of the impact of warm south, the red-crowned crane accelerated from south to north to fly. When the cold wave occurs, for the red-crowned crane movement rhythm have a greater impact.

4.b-4 Responsible visitation at World Heritage sites

(1) The status of tourism development

In 2009, the State Council executive meeting adopted the "Jiangsu coastal area development plan", and pointed out that China's eastern coastal areas of economic development is an important growth in Jiangsu coastal areas of construction and development. In 2011, Jiangsu Province issued "the views on further development and acceleration of tourism"; in 2012, Jiangsu Province invested 490 million yuan for Yancheng wetland protection and repair. Coastal wetland tourism has become the focus of the development of tourism projects in Jiangsu Province.

YS-1and YS-2: the current tourism and tourism activities are mainly in both Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve as the focus of the coastal beach natural scenery. In 2005, Yancheng successfully created a national excellent tourist city, while the establishment of the red-crowned crane and Pere David’s Deer wetland

tourism economic zone. In 2015, Jiangsu Dafeng National Nature Reserve won the "National AAAAA level tourist attractions".

Three tourist modes by transport reach to Yancheng are cars, trains and aircraft, respectively. Traffic conditions in the continuous improvement of the situation, the accessibility of the area is also increasing. Yancheng District has now opened direct the red-crowned crane wetland ecological park by bus travel lines. In 2016, domestic tourists are concentrated in Jiangsu, Zhejiang, Shanghai, Shandong and Anhui Provinces and their cities.

YS-1The main scenic spots in the nominated properties include the Pere David’s Deer Park, and Tiaozini Scenic Spot. YS-2 Yancheng Red-crowned Crane Wetland Ecotourism Zonem.

Pere David ’s deer Park, Yancheng red-crowned crane wetland eco-tourism zone has two scenic spots of full-time tour guides (a total of 32 people). Explaining the content mainly includes wild animal and plant habits, wildlife protection, biodiversity, protection of the story, protection and management status. At the same time, the descriptions with a number of promotional films and illustrations show the beauty of wetlands, animal spirit and magnificent beaches. Tiaozini Scenic spot currently is open, and no fixed guide and display area.

The three scenic spots are equipped with status display and educational facilities, including exhibition centers, signs, publications, etc. The guides can explain and promote the natural value of Yancheng Yellow Sea wetlands and wild animals and plants habits at any time for visitors.

Table 4-1 Construction area within the buffer zone of the nominated properties

Scenic name	number of employed persons	number of tour guides)	Number of facilities in the scenic area)													
			number of published species)	(Number of signs)	Exhibition Center) (㎡)	Visitor centre) (㎡)	Accommodations			Shop		parking lot		Washing rooms		
							construction area (㎡)	Number of rooms	Number of bed	Number	area (㎡)	Number	Area (㎡)	Number(seat)	Area (㎡)	Toilet seat number
China Pere David's Deer Park	120	24	28	276	2100	3000	35400	72	100	55	26310.4	2	19784	8	961	222
Yancheng Red-crowned Crane Wetland Ecotourism Zone	36	8	22	500 (ADB)	9600	1380	1558	25	48	2	105	1	15000	7	424	62(Urinal)

(2) The number of tourists forecast

At present, there are the three scenic spots within the nominated properties for the tourists to stay, shopping, parking and other facilities. In the sites, a display center, signs and full-time tour guides have been set up to provide visitors with a convenient service. In the scenic spots a total of 97 rooms, 148 beds and 3 parking lots can be provided accommodation for tourists, parking and other services.

The status of tourists who have been nominated to the nominated properties are to reach Yancheng city by car, train and airplane, and then the tourists can reach the scenic area by cars or tour line, to watch the natural beauty and stop at the concentrated area of wild animals.It is foreseeable that future nominations will attract more visitors if the nominated property enters the World Heritage List.

(3) The number of tourist control and management measures

The key places of the nominated properties, the conduct of tourism will be prohibited at any time. The level of restriction is graded according to the extent to which visitors may have an impact on the protected species, the importance of the conservation species and restriction level and degree are in Table 4-2.

Table 4-2 Restrictions on Tourism Personnel

Restriction level	Restrictio n degree	Visitors travel diameter per capita	Notes
1	strictest	A	For the ring line, do not interfere with the red-crowned crane and other wild animals as a condition
2	More strict	B	
3	not very strict	C	For the connection path between the loop and the habitat, the vegetation or water carrying capacity is used as a condition

Restriction level	Restriction degree	Visitors travel diameter per capita	Notes
4	less strict	D	Restrictions on footpaths between seawalls and popular tourist areas

Note: The distance, A <B <C <D, for different protected species, A and B length is different; for different bearing capacity of vegetation and different self-purification capacity of water, C length is different.

According to different periods and different uses, different levels of restrictions will be taken for water channels, "visitors per capita length of travel" for "the average length of the length of the cruise ship."

The same path varies at different time limits.

At the same time, for different protection objects, subordinate to different levels of restriction, the path strictly will be enforced at the level of restrictions.

In tourist areas， visitors have to choose green ways such as bicycles, camp vans, tour buses, walking etc., which should be smaller than ordinary vessels, can take less space. When choosing electric vehicles and other modes of transportation, the whistle is prohibited from disturbing wild animals. On loop roads only walking can be allowed to choose.

Tourist areas can be done based on the towns of Huangjian, Sanlong, Yuhua, Tongshang, Caomiao, Daqiao etc.. The appropriate towns will be selected as a basis for the construction of green hotels, green restaurants, green shopping centers and tourism distribution center. These towns are the western edge of the nominated properties. If a reasonable planning is made, "three wastes" are properly handled and the wild animals and plants to be protected are not used for consumption, there are almost no adverse effects on the protected area. In some of the protective areas, small and simple accommodation facilities may be constructed, which are not for the purpose of enjoying life but for tourists to observe wildlife and attend other special activities. Tourist areas require visitors to bring their own food or not eat, so the protection areas do not build hotels and shopping. The consumption activities of wild animals and plants to be protected are prohibits in shopping centers and the ordinary wild animal and plant resources shall be used

rationally.

Table 4-3 Travel time and the level of restriction

Place	time	Protected object status	Restriction degree
Yancheng Red-crowned Crane Wetland Ecotourism Zone	28th October——28th February of the following year	Red-crowned cranes in the winter, from the saltworks of Sheyang mainly far viewing the second group of red-crowned crane, nominated properties and the third group of red-crowned crane on the reed base of Sheyang	The four-level restrictions are implemented on seawall; under the seawall, a first-level restriction is implemented for the loop line and the watch towers set on the edge of Yancheng National Nature Reserve; the three-level restrictions is implemented for the connection; If the link is located in Xinyang harbor, the forbidden line; if located in the loop, the first-level limit is implemented, and if it is outside the loop, perform a three- level limit.
	20/3——30/5	During black mouth gull breeding period and migratory migratory period, mainly distant view suaeda beach in the nominated properties, black-headed gulls of Sheyang salt field seawall and the reservoir; far view of the saltwork, salina and pumping beach of Sheyang, migratory birds in middle channel harbor of the nominated properties.	
	1/8——30/10	During the migratory migratory period, mainly watch the salina and pumping beach of Sheyang, migratory birds in middle channel harbor of the nominated properties	
	Other time periods	no special protection object	The four-level restrictions are implemented on seawall; under the seawall, loop and connecting roads are the

Place	time	Protected object status	Restriction degree
			implementation of three-level restrictions
Pere David's Deer Park	Mid November ——28th February of the following year	the main watch of the fifth group of red-crowned crane in the reclamation area of Zhu Chuan, the VI small group of red-crowned crane in the reclamation area of Dongchuan during red-crowned crane over the winter	The four-level restrictions are implemented on seawall; under the seawall, loop and connecting roads are the implementation of three-level restrictions
	20/3——30/5	mainly watching black mouth gulls of Chengmen, Zhu Chuan harbor and migratory birds of Zhugang in Dongchuan during blackhead gull breeding period and migratory migratory period	The four-level restrictions are implemented on seawall; under the seawall, the loop is the implementation of a second-level restrictions, the three-level restrictions are implemented for the connection paths
	1/8——30/10	The main view of migratory birds on the beach of Zhugang during migratory birds migratory period	
	June - August, around May	Pere David's deer estrus, farrowing period	The four-level restrictions are implemented on seawall; under the seawall, the loop is the implementation of a first-level restrictions, the three-level restrictions are implemented for the connection paths
	Other time periods	Pere David's deer	The four-level restrictions are implemented on seawall; under the seawall, loop and connecting roads are the implementation of three-level restrictions

The tourist area is strictly restricted according to the time and place, a sign is set at the beginning of each section of the tour path, and some people are assigned to manage it. The publicity and education on the behavior restrictions of tourists should be given before the visitors can travel to the tourist areas through the travel agency. Also a guidance manual should be provided to visitors, which includes the following contents: non-smoking, do not make noise, do not litter, do not pick off flowers, do not go beyond the scope of activities, do not buy animal and plant products, pursue conservation principles as far as possible and adhere to the principle of saving. Especially when visitors take a ring tour of the first-level or second-level limit, they try to become a natural listener, listening walk, while walking look for wild animals (mainly birds) figure. Please do not shout, do not touch, do not move forward and maintain a certain distance between people and wild animals when visitors catch sight of wild animals. Please use natural light and cannot use the flash to prevent wild animals from being shocked when visitors take a picture of wild animals (especially birds). In order to reduce the natural "exposure" in nature and the visual pollution to the birds, visitors should try to choose "vegetation color" clothing. For artificial domesticated animals, visitors should not be fed casually, so as not to damage the ecological balance. Visitors strictly follow the guidebook issued by the tourist area, limit their own behavior, and turn yourself into an active eco-tourist.

4.b-5 Number of inhabitants within the property and the buffer zone

There are no villages and villagers within the scope of the nominated properties, and there are three companies in the buffer zones, namely, Ocean Affairs Bureau of Sheyang County, Jintan Haitou Development Co. Ltd.of Huangjian Town in Tinghu District, Fangqiang Farm, which is a total of 3517 residents.

Table 4-4 Estimated populations located within nominated properties and the buffer zones

Nominated Property	Population (person)
YS-1	the nominated property: 0 the buffer zone: 2153 Total: 2153 Year: 2017
YS-2	the nominated property: 0 the buffer zone: 1364 Total: 1364 Year: 2017

5. Protection and Management of the Property

5.a Ownership

The nominated property is owned by the People's Republic of China. The administrative rights of the natural resources, public facilities and infrastructure of the nominated properties are all state-owned. The land area covered by Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve is owned by the protection zone, and the residents have the right of residence.

5.b Protective designation

5.b-1 Protected areas

Table 5-1 Protected areas in the nominated property

Nominated properties	Protected area (time of establishment)
Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)	Jiangsu Yancheng National Nature Reserve (October,1992)
	Jiangsu Dafeng National Nature Reserve (December, 1997)

5.b-2 Legal basis for protection and management

5.b-2-1The main legal and regulatory provisions for the protection of the nominated properties

Table 5-2 Laws and regulations for the protection of the nominated properties

Name	Time of promulgation (Year)	Issuing authority
Constitution of the People's Republic of China and the amendment of the Constitution	1982	National People's Congress of the People's Republic of China
Criminal Law of the People's Republic of China and amendment of the criminal law	1979	Standing Committee of the National People's Congress of the People's Republic of China
Wild Animal Protection Law of the People's Republic of China	2016	Standing Committee of the National People's Congress of the People's Republic of China
Environment Protection Law of the People's Republic of China	2014	Standing Committee of the National People's Congress of the People's Republic of China
Water Law of the People's Republic of China	2002	Standing Committee of the National People's Congress of the People's Republic of China
Marine environmental Protection Law of the People's Republic of China	2017	Standing Committee of the National People's Congress of the People's Republic of China
Law of the People's Republic of China on Highways	2004	Standing Committee of the National People's Congress of the People's Republic of China

Name	Time of promulgation (Year)	Issuing authority
Regulations of the People's Republic of China for the Implementation of the Protection of Terrestrial Wildlife	2011	State Council of the People's Republic of China
Regulations of the People's Republic of China on the Protection of Wild Plants	1996	State Council of the People's Republic of China
Regulations of the People's Republic of China on Natural Reserves	2011	State Council of the People's Republic of China
Regulations of Jiangsu Province on the administration of coastal zones	1991, 1997	Standing Committee of Jiangsu Provincial People’s Congress
Regulations of the Jiangsu on Environmental Protection	1993, 1997	Standing Committee of Jiangsu Provincial People’s Congress
Regulations of the Jiangsu on the Protection of Marine Environment	2007, 2016	Standing Committee of Jiangsu Provincial People’s Congress
Flood Control Regulations of Jiangsu Province	2010, 2017	Standing Committee of Jiangsu Provincial People’s Congress
Regulations of Jiangsu Province on the Protection of Wild Animals	2012, 2017	Standing Committee of Jiangsu Provincial People’s Congress
Regulations of Jiangsu Province on Tourism	2015	Standing Committee of Jiangsu Provincial People’s Congress
Measures for the Declaration and Protection of the World Natural Heritage and Natural and Cultural Dual Heritage (for Trial Implementation)	2015	Ministry of Housing and Urban - Rural Development of the People's Republic of China

Name	Time of promulgation (Year)	Issuing authority
Regulations of Jiangsu Province on Wetland Protection	2016	Standing Committee of Jiangsu Provincial People’s Congress

5.b-2-2 Summary of relevant laws and regulations

1) "Constitution of the People's Republic of China"

Article 9 The State guarantees the rational use of natural resources and protects precious animals and plants. Prohibit any organization or individual from using any means to encroach or destroy natural resources.

Article 22 The State shall protect historical sites, precious cultural relics and other important historical and cultural heritages.

Article 26 The State shall protect and improve the living environment and ecological environment, and prevent pollution and other public hazards.

2) "Water Law of the People's Republic of China"

Article 5 The State shall protect water resources and take effective measures to protect vegetation, plant trees and grasses, protect water resource, prevent soil erosion and water pollution, and improve the ecological environment.

3) "Law of the People's Republic of China on the Protection of Wild Animals"

Article 6 Governments at all levels shall strengthen the management of wildlife resources and formulate plans and measures for the protection, development and rational utilization use of wildlife resources.

Article 8 The State protects wild animals and their living environment and prohibits any units or individuals from illegally hunting or destroying them.

Article 9 The State shall give priority to the protection of precious and endangered wild animals. Nationally protected wild animals are divided into level I and level II protected wild animals. The establishment and adjustment of national protection wild animals shall be made by the administrative department of wild animals under the State Council and submitted to the State Council for approval.

4) "Environmental Protection Law of the People's Republic of China"

Article 17 The people's governments at all levels shall, for all kinds of representative natural ecosystem areas, the natural distribution areas of rare and endangered wild animals and plants, the important water conservation areas, the geological structures with significant scientific and cultural value, famous karst cave and fossil distribution areas, glaciers, volcanoes, hot springs and other natural relics, as well as cultural relics, ancient and famous trees, should take measures to protect and forbidden damage.

Article 19 The development and utilization of natural resources shall be rationally developed and protected, and the ecological security shall be safeguarded, and the ecological protection and restoration and management plan shall be formulated and implemented in accordance with the law.

Article 23 Urban and rural construction should combine the characteristics of the local natural environment, protect vegetation, water and natural landscape, and strengthen the construction and management of urban gardens and scenic spots.

5) " Nature Reserve Regulations of the People's Republic of China "

Article 4 The State shall adopt economic and technological policies and measures to make for the development of nature reserves, and incorporate

the development plans of nature reserves into the national economic and social development plans.

Article 18 Nature reserves can be divided into core areas, buffer zones and experimental areas. The natural ecosystems in the nature reserves and the centralized distribution of rare and endangered plants and animals shall be classified as core areas and shall prohibit any organizations and individuals from entering. Except for the provisions of Article 117 of this Regulation, and the core zone is not allowed to engage in scientific research activities. The buffer zone can be settled outside the core zone, only allowed to engage in scientific research observation activities. The experimental zone can be settled outside the buffer zone, which allowed to carry out the scientific experiments, teaching practice, tourism and domestication, breeding rare, endangered wild animals and plants and other activities. The people's government that originally approved the establishment of a nature reserve may, if necessary, delimit a certain area of the external protection zone in the periphery of the nature reserve.

6) “Regulations of the People's Republic of China on Protection of Wild Plants”

Article 9 The State protects wild plants and their habitats. Any unit and individual illegal collection of wild plants or the damage of habitats are prohibited.

Article 11 In the habitats of national and local protected wild plants and animals, the nature reserve shall be established in accordance with the relevant laws and administrative regulations.

Article 14 The administrative department of wild plants and the relevant units

shall be responsible for the conservation of the environment and shall, if necessary, establish breeding bases and germplasm resources library or take ex situ conservation measures for protection of the national and local wild plants.

7) “Regulations of the People's Republic of China on the Implementation of Terrestrial Wildlife Conservation”

Article 8 Any units and individuals are prohibited from undermining the national and local protected wildlife breeding and living habitats.

8) “Regulations on Wetland Protection in Jiangsu Province”

Article 29 Except as otherwise provided by laws and regulations, it is forbidden to engage in the following acts in important wetlands:

(1) reclamation, landfill wetlands;

(2) digging sand, soil, mining, establishing pond, burning;

(3) the introduction of alien species or released animals;

(4) destruction of wildlife habitats and fish migration routes;

(5) hunting wild animals, picking up birds or collecting wild plants, catching fish or other aquatic organisms in a extinction mode;

(6) accessing or cutting off wetland water;

(7) dumping or stacking solid wastes, discharging untreated sewage and other toxic and hazardous substances;

(8) other acts that destroy the wetlands and their ecological functions.

5.c Means of implementing protective measures.

5.c-1 Management system

The two national nature reserves have been managing the nominated property. Upon nomination, Yancheng Municipal People's Government of Jiangsu Province has approved the establishment of World Heritage Application and Management Office Yancheng Municipality as a unified administration office to lead the management of the nominated properties and buffer zones.

5.c-1-1 National level

The Ministry of Housing and Urban-Rural Development of the People's Republic of China and the National Committee of UNESCO of China are responsible for guiding the application for nomination, protection and management for the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I).

5.c-1-2 Level of Jiangsu Province

Jiangsu Provincial Office of Housing and Urban and Rural Development has established a leading group office to guide the work of wetland resources protection, as well as nomination of World Natural and Cultural Heritage.

5.c-1-3 Local level

For the nomination, a work leading group and a leading group office have been set up in Yancheng Municipal People's Government. Also, a unit responsible for nomination has been established in Administration Bureau of Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve, according to the requirement of Yancheng Municipal People's

Government. In case of inscription, the nomination unit will be turned into heritage management organizations. In accordance with the principle of territorial management, the heritage management organizations are responsible for the protection and management of nominated properties and buffer zones.

Administrations of Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve are responsible for the management of the nominated properties. The application office in Yancheng has integrated the two reserve administrations of the protected area to establish a unified management organization, further strengthening the protection and management of the nominated properties.

Fig. 5-1 Management of the nominated property

5.c-1-4 Mechanism of management and coordination

The World Heritage Application and Management Office in Yancheng

Municipality is responsible for the coordination of the two nature reserves and the local government, to ensure their communication and the implementation of management plan.

5.c-2 Content of protection

The nominated properties have made a plan with specific requirements for the protection and management of the sites from different aspects, aiming to protect the elements of Outstanding Universal Value of the nominated property:

(1) Conservation of biodiversity and habitats: The value of biodiversity is mainly embodied by the unique animals, plants and the ecosystem, including spoon-billed sandpiper, red-crowned crane, hooded crane, Siberian crane, Oriental white stork, whooper swan, black-faced spoonbill and other national I-class or II-class protected birds and threatened species, as well as Pere David's deer, river deer and other protected mammals. Endangered plant and animal species and their habitats are the major focus of protection.

(2) Conservation of the ecosystem evolution process: the nominated sites not only represent the typical characteristics of the coastal and marine ecosystems and their changes in landscape pattern, but also highlight the evolution of their plant communities against the background of the dynamic changes in coastal landscape. At the same time, their ecosystem supporting services also fully reflect the ecological and physiological processes in various organisms related to adaptation and evolution, making the area an outstanding example of coastal and marine ecosystems.

(3) Water body protection: The water bodies including natural rivers and

coastal wetlands in the nominated properties will also become an object of protection.

(4) Pollution control: the atmosphere and water quality should be strictly controlled in the nominated property and the buffer zones to prevent pollution.

5.c-3 Zoning

5.c-3-1 Zoning for the nominated properties

The main objects of protection are the key or representative species, ecosystems and biological processes, namely, the areas of Outstanding Universal Value and animal and plant habitats. The distribution area is the core area of Yancheng National Nature Reserve and the core area of the northeastern direction of Jiangsu Dafeng National Nature Reserve, which covers an area of 153,244 ha, accounting for 100% of the nominated properties.

The natural ecosystems and landscape of the nominated properties must maintain the status quo. Tourism or any construction facility will be prohibited, and only configure the necessary researches, monitoring and safety protection facilities. The interference of the indigenous residents to the ecological environment must be limited and ecological restoration must be emphasized in the nominated properties.

Fig. 5-2 Zoning for the nominated properties

5.c-3-2 Buffer zones

The buffer zones are under the protection of Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve. These areas are managed according to the regulations of National Nature Reserves, protecting species like red-crowned crane, hooded crane, Siberian crane, Oriental white stork, whooper swan, black-faced spoonbill and Pere David's deer. The objectives of buffer zone management are to reduce the pressure posed by socioeconomic development on the elements of Outstanding Universal Value in the buffer zones, and to explore a sustainable way of utilizing the natural resources.

The management office of the nominated properties is responsible for the coordination with the relevant local government on the ecological protection of the buffer zones, in accordance with the law and coordinating the interests of stakeholders. The management measures of the buffer zones are as follows:

(1) All construction projects in the buffer zone require permission by the governments according to the management principles. All construction plans in the buffer zone must comply with the requirements of the protection and management planning for the nomination of the estate.

(2) Relevant departments within the estate management system shall fully coordinate and strictly control the construction scale and function of each facility, and shall not build up aquaculture industry or industry which is polluted and has an impact on the ecological environment of nomination;

(3) The government should guide the adjustment of industrial structure and reasonably develop the tourism industry. Under the premise that all land use patterns are consistent with the protection requirements of the nominated

land, the government can build a tourism service base to help increase the income of community residents in the buffer zone.

(4) Governments at all levels should implement the ecological compensation policy in the buffer zone in accordance with the ecological protection of wetlands and the policy of returning farmland to wetland.

(5) The heritage management agencies should, in conjunction with local governments and local communities, promote the fine culture of the community, encourage community members to participate in nature protection and strengthen the environmental protection and management of the buffer zone. At the same time, it should give full play to the role of residents in the buffer zone's indigenous communities and organize the participation of local residents in the protection of coastal wetlands and wildlife.

(6) Establishing the "1 + X" negotiation mode, that is, taking the management agency of the nomination as the lead unit, consulting and discussing the demands put forward by the relevant stakeholders in accordance with the requirements of protection and management planning, and the problems that are difficult to be coordinated are unified by the local government Coordinated solution. Jiangsu Provincial World Natural Heritage Management Commission conducted an occasional inspection of the implementation of the buffer coordination mechanism to promote its continuous improvement and effectiveness.

(7) Financial administrations at all levels give priority to the construction of public service facilities in the buffer community.

5.c-4 Monitoring

Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve are monitored by the corresponding protection stations. There are two ways of monitoring: self-monitoring and delegate commission monitoring. The management organizations of the nominated properties will be in charge of the monitoring of ecological conditions, environmental conditions, tourism activities, illegal activities, and community status. As the management office lack professional personnel or monitoring equipment, monitoring contents such as geology, earthquakes and groundwater will be commissioned on a regular or irregular implementation of monitoring by the relevant professional departments, research institutions or universities such as Fudan University, Nanjing University, Nanjing Normal University, Nanjing Forestry University, Yancheng Institute of Technology, Beijing Forestry University, National Birds Central Anniversary Center, British Bird Alliance, Royal Bird Protection Association (RSBP), wader experts from New Zealand and bird ringing experts from Scotland, based on the establishment of monitoring and research base.

5.c-4-1 Means of monitoring

The nominated properties are monitored by means of fixed-point observation, instrument monitoring, patrol monitoring of community and statistic surveys. Four levels of management Region - Branch - Station – Point have been established in Yancheng National Nature Reserve to monitor the status of the protection area. 12 of stations has been built in the Yancheng, including Chuandong Station (YS-1), Jianggang Station (YS-1), Xinyanggang Station (YS-2), Dongshagang Station (YS-2), Xiaoxinhe Station (YS-2), Lijiadun

Station (YS-2), Xiaba Station (YS-2), Sanlizha Station (YS-2). The 6 stations in YS-2 have a total of 19 people, 3 boats, 5 SUV, 5 unmanned aerial vehicles, 15 telescopes, 4 handheld GPS, 4 sets of law enforcement recorder, 12 motorcycles, 10 interphones and other equipments. Jiangsu Dafeng National Nature Reserve has established the two protection stations, namely the second stocking area and the third stocking area, with 4 staff, as well as 4 telescopes, 4 handheld GPS, 4 interphones, 4 battery cars and 1 patrol car.

5.c-4-2 Data processing

The scientific research departments of the Administrations of Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve are responsible for the collection and analysis of data. In case of emergency, the management office timely report to the high-level for decision-making, and effectively deal with the emergencies. The management organizations will regularly deliver the data of monitoring to relevant institutions for analysis and archiving, and also will regularly monitor the data commissioned by universities or research institutions for analysis and research, and strive to solve tough problems in time.

5.c-5 Local protection tradition

In the eyes of the people of Yancheng in Jiangsu, the crane is different from the other birds, and she always accompanies the good expectations. It is a famous "cultural bird", a symbol of "longevity", "luck", "good health" and "loyalty" in people's minds. In the reserve, Public Security Frontier Corps of Jiangsu Province sets up a road port border police station in the wetland border, and a "team of crane guards". They patrol the border of the reserve day and night, and guard wild animals and plants.

5.c-6 Civic participation and community involvement

The nominated properties are closely linked to the local community. Through a lot of hard work of the staff in Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve, the community residents support the protection work with voluntary activities. Red-crowned cranes found to be sick in winter would immediately be reported or sent to the protection area for treatment. Any person found to kill wild animals would immediately be reported to the local public security, forestry and protection area management. The past "hunters" have become into today's "informants" in the community, and these will win the initiative for the full range of protection.

In order to promote science communication and scientific research, the two nature reserves have established long-term friendly relationships with the local schools, institutions and media.

5.d Existing plans related to municipality and region in which the proposed property is located

5.d-1 The existing relevant planning of Province in the nominated properties

5.d-1-1 The related planning of the Province in the nominated properties

The 13th Five-Year Plan of Economic and Social Development in Jiangsu Province (Government of Jiangsu Province, 2016);

The 13th Five-Year Plan of Economic and Social Development in Yancheng Municipality (Government of Yancheng Municipality, 2016).

5.d-1-2 Conservation plans that currently cover the nominated property

Biodiversity Conservation Strategy and Action Plan of Jiangsu Province (2013-2030) (Environmental Protection Office of Jiangsu Province, 2013);

Integrated Water Resources Planning of Jiangsu Province (People's Government of Jiangsu Province, 2011);

The Ecological Red Line Protection Plan of Jiangsu Province (People's Government of Jiangsu Province, 2013)

Ecological Protection and Construction Planning of Jiangsu Province (2014-2020) (Forestry Bureau of Jiangsu Province, 2015)

Marine Ecological Red Line Protection Plan of Jiangsu Province (2016 - 2020) (Ocean and Fishery Bureau of Jiangsu Province, 2017)

Overall Plan of Yancheng National Nature Reserve (2008-2020) (Environmental Protection Office of Jiangsu Province, 2009)

Overall Plan of Jiangsu Dafeng National Nature Reserve (2013-2022) (Forestry Bureau of Jiangsu Province, 2013)

5.d-2 Summary of relevant provisions of the plan

(1) Overall Plan of Yancheng National Nature Reserve (2008-2020) (Environmental Protection Office of Jiangsu Province, 2009)

The plan was formulated in 2009 and approved by Environmental Protection Office of Jiangsu Province. There are fourteen chapters in the plan.

Chapter 1 summarizes the origin of the plan, the basis for the preparation, the guiding ideology and planning principles, as well as the planning scope and time limit.

Chapter 2 describes the basic situation of the protection area. Yancheng National Nature Reserve belongs to wildlife category in the wild animal type. Protection area is on the south side of the estuary of Guan river in north of Chenjiagang Town of Xiangshui County, north of Xiangshui Chenjiagang town of Guan River Estuary, on the north side of the estuary of Sancang river in south of Dongtai City. The western boundary of the area is mostly the old seawall in 50s, where is the part of the appropriate section to move to the west between Xiangshui County and Sheyang County, on the east side of the sea minus 3 m isothermal line for the boundary.

Chapter 3 elaborates the historical evolution and the significance of the protection area, the main object of the protection area and its orientation and evaluation, the evaluation of the functional zoning and the management of the protection area, and the protection status quo.

Chapter 4 sets out the overall objectives of the plan.

Chapter 5 describes resource conservation and management planning.

Chapter 6 deals with research and monitoring programs.

Chapter 7 deals with publicity and education.

Chapter 8 clarifies the rational exploitation and utilization of resources.

Chapter 9 sets out the comprehensive environmental improvement plan.

Chapter 10 clarifies the key construction project planning.

Chapter 11 sets out the administrative planning.

Chapters 12 through 14 illustrate the assessment of investment and the implementation of planned safeguards and benefit analysis.

(2) Overall Plan of Jiangsu Dafeng National Nature Reserve (2013-2022) (Forestry Bureau Jiangsu Province, 2013)

Chapter 1 elaborates the background of the project, the basis of preparation, guiding ideology and principles, planning period and so on.

Chapter 2 describes the basic situation of the protected area and the status quo evaluation.

The protected area is situated in the southeast, where borders on gate of Tan Tu and Tun Men in Dongtai City. It is next to the Xin Cao farm in Jiangsu Province. It is connected to the forest farm of Dafeng and the Dongchuan farm in Shanghai on the west, and the north (northeast) is the vast ocean.

Chapter 3 sets out the overall layout of protected areas where includes the nature of protected areas and protection targets, planning objectives, functional zoning and layout of protected areas, and overall layout.

Chapter 4 sets out the planning.

Chapter 5 deals with key construction projects

Chapters 6 through 8 describe investment estimates and fundraising, safeguards and benefit evaluations.

5.e Property management plan or other management system

5.e-1 Existing conservation and management plans of the nominated properties

A management plan of the nominated property. A copy of the plan is attached in Annex 3.

Table 5-3 Existing planning for Nominated properties

Management plan	Compiled by	Time of approval
Management Plan of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)	Peking University	2018

5.e-2 Analysis and explanation

Based on principles of sustainable development, the Management Plan of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) was prepared by Peking University. It consists of 15 chapters:

Chapter 1 elaborates the background, main idea, planning type, application scope, basis of compilation, planning period and planning scope.

Chapter 2 shows the general situation of the nominated property, including geographic location, heritage type, natural history, human history, protection and management history of heritage.

Chapter 3 highlights assessment of current status of heritage, including the current state of management as well as stresses and threats.

Chapter 3 describes composition of heritage, includes ecosystem, avian habitat and flyway, Habitats of Pere David’s Deer and other mammals, intertidal zone of the Yellow Sea and radial sand ridges.

Chapter 4 lists the general rules of planning, including the basis, goals and principles of planning.

Chapter 5 emphasizes the conservation of elements with Outstanding Universal Value, including coastal wetlands, radial sand ridges and biodiversity.

Chapter 5 describes the planning of management divisions.

Chapter 7 describes the management of potential disaster risk.

Chapter 8 describes the plan for demonstration and education, including visitors management.

Chapter 9 illustrates the effective evaluation methods.

Chapter 10 elaborates scientific research plan.

Chapter 11 emphasizes community participation, including community profile and plan for sustainable development of the local community.

Chapter 12 describes in detail the current and planned management system.

Chapter 13 illustrates the action plan, including a general time table and estimation for investment.

Chapter 14 demonstrates the legal and financial guarantees for the management of the nominated property.

Chapter 15 lists the supplementary provisions.

5.e-3 Guarantees for effective implementation

5.e-3-1 Legal guarantee

The laws and regulations of the People's Republic of China and the local laws and regulations of Jiangsu Province meet the management needs of the nominated properties (see 5b-2 in detail), so that the protection and management of the nominated properties can be protected according to law. At the same time, the nominated properties are working on the development of new special regulations to provide protection for the nominated properties.

5.e-3-2 Management support

The nominated properties have a high-quality management team in which is from the Ministry of Housing and Urban and Rural Construction, the State Forestry Administration and other national level management organizations to the Jiangsu Provincial Housing and Urban Construction Bureau, the Provincial Forestry Bureau, the Provincial Environmental Protection Bureau and other provincial-level specialized management organizations. The nominated properties have also set up a corresponding management organizations. Each division is responsible for the work of division, cooperating and co-managing, and strong organizational support will be provided to implement protected management plans for the nominated properties (see Table 5-4).

Table 5-4 Main management authorities and their duties in the nominated properties

Order	Name	Summary of related duties	Address
1	Ministry of Housing and Urban-Rural Construction of the People's Republic of China	To draw up and implement the development plan, policy and guide of the national scenic areas, to be responsible for the review and approval of the state-level scenic spots and supervision and management, to organize the declaration of the world's natural heritage, and review the declaration of the world's natural and cultural heritage with the relevant authorities, to be responsible for the protection and supervision and management of historical and cultural cities (towns and villages) with the competent	Sanlihe Road 9, Beijing, Haidian District,

Order	Name	Summary of related duties	Address
		department of cultural relics.	
2	Department of housing and urban rural construction of Jiangsu Province	To undertake the declaration of the scenic areas, the world's natural heritage and the world's natural and cultural heritage, to be responsible for supervision, management, guidance and other work of scenic spots, the world's natural heritage and the world's natural and cultural heritage, to undertake the daily work of the lead group of declaration of world heritage in Yancheng.	Development Building, No. 88, Caochang Gate Street, Gulou District, Nanjing, Jiangsu
3	Jiangsu Yancheng National Nature Reserve	To implement the national laws and regulations and policies on the management of nature reserves; to be responsible for Yancheng National Nature Reserve planning of Yancheng and construction and management work; to be responsible for the organization and implementation of wild animal and plant protection and the protection of the natural environment in Yancheng National Nature Reserve; to organize the investigation and monitoring of resources; to be responsible for coordinating the relationship between protected areas and local governments.	No. 8, Crane Road, Xinyang Gang, Huangjiang Town, Tinghu District,Yancheng City
4	Jiangsu Dafeng National Nature Reserve	To carry out the national laws and regulations and policies on the management of nature reserves;	Caomiao Town, Dafeng District, Yancheng City,

Order	Name	Summary of related duties	Address
		to be responsible for Jiangsu Dafeng National Nature Reserve planning and construction and management in Dafeng; to be responsible for the organization and implementation of Jiangsu Dafeng National Nature Reserve wildlife protection and the protection of the natural environment in Dafeng; to carry out resource investigation and monitoring; to coordinate the relationship between protected areas and local governments.	Jiangsu

5.e-3-3 Community participation

The local community plays an important role in the management of the nominated properties and buffer zones. The life of local residents relies on the environment, inseparably related to the effect of protection of the nominated property. The effort of implementing conservation plans has been continuously improving the participation capacity and ecological awareness of the local community. In terms of resource management, the participation in conservation and management by the local community has turned from passive to positive, further facilitating the implementation of conservation and management plans.

5.f Sources and levels of finance

For a long time, national and local governments, and the management office attach great importance to the investment on the protection of the nominated properties. The investment by these authorities is increasing year by year, meeting the protection and management needs of the nominated property. Capacity building programs sponsored by the State and Asian Bank contribute to the funding every year, according to the actual usage of the

conservation projects.

Table 5-5 Source of funds of (Unit: RMB Yuan)

Year	Provincial funding		Total
	Jiangsu Yancheng NNR	Jiangsu Dafeng NNR	
2012	5415900	703300	6119200
2013	5776100	893300	6669400
2014	6167800	2022400	8190200
2015	6428500	2085300	8513800
2016	6845400	2294000	9139400

5.g Sources of expertise and training in conservation and management techniques

The nominated properties have invited domestic and foreign experts and scholars to study the geological topography, biodiversity and other elements of scientific interest, and to guide the protection and management. At the same time, the nominated properties also gain support and guidance from the Ministry of Housing and Urban and Rural Construction of China, Ministry of Land and Resources of China, the State Environmental Protection Department of China, the State Forestry Administration of China, Fudan University, Nanjing University, Beijing Forestry University and other departments and research institutions. Regular or irregular trainings for the staff of nominated properties are supported by Jiangsu Provincial Department of Land and Resources, Environmental Protection Department, Forestry Bureau, Tourism Bureau and other departments. The training covers relevant

laws and regulations, resource protection, heritage planning and management, bird identification and rescue, community development and so on. The staff have acquired a deep understanding of the value and protection methods of the nominated properties.

5.h Visitor facilities and infrastructure

At present, there are three scenic spots in the nominated properties and the buffer zones, namely, China Pere David's Deer Park, Yancheng Red-crowned Crane Wetland Eco-tourism Area and Tiaozini Scenic Area, all located in the experimental zones of Jiangsu Yancheng National Nature Reserve and Jiangsu Dafeng National Nature Reserve. Visitors mostly arrive by plane, train or car (driving or tour bus).

At present, China Pere David's Deer Park can receive visitors with 72 rooms, 100 beds and 2 parking lots; Yancheng Red-crowned Crane Wetland Eco-tourism Area has 25 rooms, 48 Bed and 1 parking lot. These two scenic spots also provide visitors with souvenirs, as well as audio and video products. Tiaozini Scenic Area is currently an open area, with no fixed area for guidance or display.

Table 5-6 Visitor facilities near the nominated property in Yancheng

Tourist service facilities		Number
Explain / explain	Tour route	/
	guide	32 persons
	Sign	776
	Publication	50 kinds of books
Exhibition Center		2 places，11700m^2

Visitor center	2 places，4380m^2
Accommodation	97 rooms，148 beds
Shop	57
Parking lot	3
Bathroom	15

5.i Policies and programmes related to the presentation and promotion of the property

At present, Jiangsu provincial govement has brought the nominated properties into Jiangsu society and economic development planning, they also establish the basic principles such as “scientific planning, unified management, stricted conservation, sustainable using”. They also have some policy on the heritage expenditure and protection.

5.i-1 Scientific Research

In recent years, Nanjing university, Nanjing normal university, Nanjing forestry university, Fudan university, the northeast institute of geography and agricultural ecology of the Chinese academy of sciences, the Ministry of environmental protection, Nanjing institute of environmental science and other institutions, as well as the Jiangsu provincial forestry bureau and other departments have been conducted great number of research programs and achievement in wetland ecosystem services, wetland landscape research, landscape changes, soil organic carbon accumulation, bird distribution and migration law, red-crowned crane overwintering, Pere David’s Deer habitat and so on. It laid a solid foundation for the ecological protection of the nominated properties, the laws of species migration and the formulation of

protection policies. Table-5-7 is a short list of these programs.

5.i-1-1 Scientific research achievements

Table 5-7 Results of Previous Research Projects

Features of Project			The Main Focus of the Research	Person in Charge
Features of Project	**Project Number**	**Level of Project**		
The Impact Assessment of Ecological Service Function of Wetland due to Reclamation and Sustainable Utilization of Resources	2013CB430405	National	Based on the eco-integrity of the wetland ecosystem in the Dajiang River Delta, the evaluation index system and method of wetland ecological service function were developed. The response and change trend of wetland ecological service function were evaluated and forecasted for different wetland ecological types based on the changes of ecological service function of different types of wetland ecosystems, the characteristics of change and uncertainties of various influencing factors. The conversion and mutation of ecological service functions and failure threshold were simulated and identified and sustainable use of the wetland resources was put forward to provide theoretical guidance and technical support for the wetland ecological restoration and safety control.。	An Shuqing

Research and Prediction of Sedimentation and Coastline Variations in Jiangsu Coastal Lines	BK2011012	Provincial	Through the collection of relevant data such as historical data, maps, remote sensing images and observation of the key sections of the shore area, this paper studies the historical evolution of the coastlines of Jiangsu, analyzes the causes and mechanisms of the erosion of the coastal tidal flats, and predicts future trend of the coastal evolution in Jiangsu. On this basis, the data of Jiangsu coastline shoreline were collected and the data base was established. At the same time, the index system and the evaluation model of the beach sediment have been established. In addition, an auxiliary decision-making system was set up for monitoring and predicting the changes of the beach sediment and coastal lines of Jiangsu Province, which has provided technical support and auxiliary decision making for the management of resources development and protection.	Gao Shu
A Study on the General Trend and Driving Mechanism of the Accumulation of Organic Carbon in Salty Bog Soil of Spartina Alterniflora	41273082	General of National Natural Science Fund	(1) A study on the reproductive mode of spartina alterniflora, including its basic characteristics of growth and investigation of community succession, and investigation of the seed germination, asexual ramets and seedling growth, growth and reproduction of Spartina alterniflora. (2) A study on the dynamic change of scope and driving factors of soil organic carbon pool of Spartina alterniflora, including dynamic change of time distribution of the organic carbon pool, the dynamic change space distribution of the organic carbon pool, the time and spatial dynamic distribution of the soil organic carbon sub-pool, and the feedback mechanism among the environmental factors.	Liu Jin’e

Study on the Response Mechanism of Temporal and Spatial Evolution of Wintering Crane to Human Activities and Spartina alterniflora	31570459	National Program	Red-crowned cranes are global endangered species and are of great value in biodiversity conservation. Yancheng coastal wetland is the largest wintering land of red-crowned cranes, which is affected by the invasion of human activities and Spartina alterniflora. The habitat area is shrinking, the landscape structure and process are changing continuously, the population number is decreasing and the wintering of cranes is facing a huge threat. Based on cutting edge researches and multi-disciplines, this paper makes use of information about the high-resolution remote sensing, GIS, computer technology and model simulation methods to conduct a research on the habitat quality of the red-crowned cranes from the perspective of multi-scale structure-process-function coupling effect, which was supported by field survey data for three consecutive years. The features of Multi-choices for the wintering of red-crowned cranes have been recognized. A spatial and temporal evolution model of the habitat quality of red-crowned cranes based on the process was established. The temporal and spatial evolution of the habitat quality of the red-crowned cranes and their response to human activities and Spartina alterniflora were revealed. And the long-term habitat quality evolution of red-crowned cranes and its effect on the number of wintering populations was clarified through long-term sequence simulation. The results of the study helps to deepen the understanding of the temporal and spatial dynamics of the wintering habitat of the red-crowned cranes from th。	Liu Hongyu

Dynamic Simulation of Coastal Wetland Landscape Evolution Based on Ecological Process - A Case Study of Yancheng Coastal Wetland in Jiangsu Province	41071119	National	This study intended to meet the strategic needs of national and regional development through reviewing current international researches. Under the background of uplifting Jiangsu's coastal development to the national strategic development based on the special geographical location and natural geography of Yancheng coastal wetland, it is necessary to correctly grasp the relationship between the landscape pattern and ecological process of the coastal wetland under the influence of nature and human beings. The study was started from monitoring the process system of wetland hydrology, soil and biology and other ecological processes to reveal the wetland biological and non-biological elements of the spatial and temporal evolution process and the regular patterns. It also endeavored to clarify the dynamic evolution relationship between the ecological process of the wetland and the landscape patterns. The study established the coastal wetland landscape dynamics simulation model based on the ecological processes to further reveal the evolution pattern of the coastal wetland landscape under the difference of the natural and humans.. The future trend of the coastal wetland landscape is forecasted by simulating the different man-made management methods. To coordinate the protection and rational exploitation and utilization of the coastal wetland, the wetland ecological function maintenance mechanism, the wetland protection and management control measures were also put forward.	

Monitoring of Endangered Birds in Jiangsu Wetland	Green Jiangsu (2015)	Provincial	Jiangsu is rich in wetland resources, especially in the coastal areas of Yancheng has a vast beach wetlands, is China's largest coastal wetland wetlands. Because of its presence in the East Asian migratory route, millions of migratory birds are parked here every year. Jiangsu wetland endangered birds monitoring to be selected in the province a number of monitoring points, wetland bird monitoring, which in Yancheng coastal wetlands from Dongtai to Xiangshui were set up monitoring sites, regular monitoring of waterfowl species and population.	Lu Changhu
The Impact of Spartina alterniflora on Red - crowned Crane in Yancheng City	31670432	National	The Impact of invasion of Spartina alterniflora on red - crowned crane in Yancheng National Nature Conservation. Based on the analysis of habitat types and distribution patterns caused by the invasion and expansion of Spartina alterniflora, the habitat selection mechanism of red - crowned cranes and the distribution pattern and availability of food (especially benthic animals) And to discuss the protection response of the red-crowned crane habitat in the protected area and the protection of the overwintering population.	
Study on the Variation Characteristics and Correlation of Sulfur and Methane Fluxes on the Gradient	41271122	National	Based on the research of the Ministry of Science and Technology and the Project the National Natural Science Fund, the project team, relying on the Eco-and Environmental Laboratory, has conducted research on the carbon, nitrogen, sulfur and chlorine elements in the coastal areas of northern Jiangsu since 2000. In order to solve the problem of regional demand and scientific research, this paper carried out the research on the elemental cycle of the salt marsh ecosystem and its response to regional climate	Wang Jinxin

of the Salt Marsh and Vegetation Interaction in Coastal Zone			change, and achieved gratifying achievements. The paper has been published in the famous journals of geology and ecology and the trained a group of graduate students and young scientific and technical personnel, to build an active research team.	

Study on the Protection Plan of Biodiversity in Shanghai Binhai Protected Area	31600437	National	1) Impact of sea level rise on coastal nature reserves The rise in sea level will have direct and indirect effects on coastal protected areas, including direct impacts including coastal wetlands and rising habitat of biological habitats, including indirect habitat and changes in priority protected areas. This study will account for changes in the area of different land cover types such as water bodies and wetlands in the case of a specific height rise at sea level.The habitat of some rare species such as red-crowned cranes, black-headed gulls, black-faced spoonbills and Pere David's in this research project will be affected by sea-level rise. This study will be based on the species habitat model (MaxEnt; Phillips et al., 2006) to simulate changes in habitat before and after sea level rise. The species habitat model is based on the ecological attributes of the species, land cover and other relevant spatial data Species spatial distribution model. Through the selection of indicative species in protected areas, the species habitat model can be used to clearly identify the impact of habitat rise by sea level. 2) Identification of priority protected areas adapted to sea level rise Priority areas will change as sea levels rise, and to accommodate this change, protected areas need to be adjusted to effectively protect biodiversity. In this study, the conservation planning software Marxan (Ball et al., 2009) will be used to identify the priority protected areas before and after sea-level rise. The identification of priority areas prior to sea-level rise can be used to evaluate the status of protected areas and to analyze	Zhu Mingjian

			existing Whether the area can effectively protect biodiversity and the identification of priority protected areas after sea-level rise can be adjusted for the adaptation of protected areas to sea-level rise (eg, expanding the area of existing protected areas, adding new protected areas Etc.) to provide scientific decision-making basis.	

Artificial breeding of red-crowned crane wild release and tracking (National Natural Science Fund Project)	31470460	National	Grus japonensis is a genus of Gruiformes, Gruidae, Grus, and a national first-class protected animal. The number of wild populations is only about 2 600, distributed in Russia, Japan, Korea, Korea and China. At present, China's captive red-crowned crane population of 1 248, distributed in the China Zoo Association 62 member units. Zoo is an important base for ex situ conservation of wild animals. The size of the domestic population of red-crowned cranes has been sufficient to support the project of red-crowned crane, which provides animal sources for the re-introduction of red-crowned crane. Work situation: in November 2013, December and January 2015, March, in Yancheng National Nature Reserve (14) and Heilongjiang Lindian Nature Reserve (2) released a total of 16 captive red-crowned cranes The The use of satellite transmitter signal transmitter (PTT) and field direct observation method for tracking monitoring research. At present, the main task is to track the survival of the wild red-crowned crane, the selection and utilization of the habitat of the flying crane, the analysis of the feeding habits, the wildness of the red-crowned crane, and the associated species. According to the experience of the American Crane, if the red-crowned crane fails to migrate to the northern breed with wild boils, it is possible to establish non-migratory populations in the Yancheng Sanctuary and to reproduce locally in the Yancheng Nature Reserve.	Cui Duoying(Zhang Jinguo)

Reproductive Countermeasures and Ecological Adaptation of Black - headed Gull in Constructed Wetland	31372226	National	In this project, the breeding ground of black-headed gulls in typical artificial and natural wetlands was selected. The field monitoring and control experiments were used to quantitatively analyze the selection of nests in artificial and natural wetlands, anti-predation strategy and breeding success rate. This paper analyzes the occurrence mechanism of the black sheep gull marriage system and the number of eggs in the supernatant. The multidimensional statistical analysis and model simulation are used to study the ecological adaptation mechanism of the different breeding strategies of the black gull in the constructed wetland. The results provide a scientific basis for the management, restoration and reconstruction of black-headed gull populations and their habitats in different constructed wetlands, and provide reference for revealing the evolutionary theory of breeding behavior of birds and birds.	Jiang Hongxing
Distribution and Migration of Important Birds in Eastern Coastal Areas	2016YFC1201900	national	A total of 2-3 species of important waterfowl population, habitat characteristics and migration patterns were collected. Combining the results of pathogenic microbiological examination of collected samples, the target waterfowl was carried out to carry known and the spread of unknown pathogenic microorganisms and epidemic risks; in accordance with the needs of the project, to provide sub-project tasks related to the distribution of wild animals and electronic Atlas.	

Phosphorus Adsorption and Desorption of Soil in Coastal Tidal Flat and Its Response to Cover Change / Salinity Dynamics	41301551	National	There are still some systematic experimental studies on the influence of the development of coastal beach development, reclamation and other human activities on the key biological geochemical processes of the beach elements. The project is based on the typical coastal beach soils in Yancheng area. Phosphorus is the representative source factor, soil and water interface adsorption and desorption are the key biogeochemical processes. Through the analysis of phosphorus in the water- Control factors, the project reveals the impact of human activities on key biogeochemical processes of the elements of coastal beach. To provide a basis for the protection and rational development of coastal tidal resources, the project seeks to take into account the land demand and coastal ecological protection of sustainable development.	Liu Yang
Study on Environmental Behavior and Flux Model of Heavy Metal Contaminants in Coastal Wetland of Jiangsu Province	BK20131219	Province	In this study, shoal wetland of Yancheng in Jiangsu was used to study the environmental behavior of heavy metal contaminants in the system with Pb and Cd as heavy metal pollution elements, and the input flux and sedimentation records of heavy metal contaminants from human genes were obtained. The sedimentary flux of heavy metals in the wetland of the shoal is estimated, and the sedimentary flux model of the wetland element is established. The scientific basis and technical support for the chemical research, pollution evaluation, environmental management and economic development of the whole coastal beach wetland are established.	Zhang Yingying

Water, Soil and Gas Monitoring in Yancheng National Nature Reserve			Based on the objective observation of surface water, soil and air pollution in Yancheng National Nature Reserve, the pollution level and environmental quality of Yancheng National Nature Reserve were analyzed and evaluated by detecting the main physical and chemical parameters of surface water, soil and atmosphere. District key pollutants and key sources of pollution. On this basis, the paper put forward to improve the environmental quality of protected areas and reduce the risk of countermeasures and recommendations for the protection of protected areas to provide scientific basis and decision support.	Fu Qiang
A Scientific Investigation of Yancheng National Nature Reserve		Natural Reserve Project	To carry out scientific investigation work in the Yancheng National Nature Reserve, investigation includes: A. plant resources; investigation of benthic animal B.; C. fish survey; D. mammal survey; E. (types of migratory waterbirds in migratory waterfowl habitat survey, the number of master reserve distribution and activities of migratory waterfowl).	Li Bo

Geographical Patterns and Prediction of the Effects of Plant Invasion on the Vegetation and Its Related Carbon Processes in China's Coastal Salt Marsh Wetland	41630528	National	Coastal salt marsh wetlands are an important guarantee for the ecological security of the densely populated coastal zone, but the evolution of the structure and function of the system is considered to be closely related to the impact of invasive species. The purpose of this project is to study the distribution and structure of the indigenous salt marsh wetland in China, and to study the vegetation distribution and structure of the indigenous algae, underground carbon storage and its stability and related ecosystem processes, revealing the geographical variation pattern and causes of its impact. On the basis of this, the pattern of carbon process of coastal saline marsh wetland ecosystem in China was discussed through simulation, and the trend of carbon sink / source in salt marsh wetland under the background of plant invasion was predicted based on future climate change scenarios. Based on the national comparison of the impacts of the invasive species, this project not only understands the dynamics of carbon sinks / source in the salt marsh wetland under the background of plant invasion, but also helps to reveal the basic characteristics of carbon processes in China's salt marsh wetlands, Understanding of Spatial Differentiation and Maintenance Mechanism of Carbon. In addition, through the implementation of this project, we expect in the global changes and biological invasion and other fields to achieve important original results, the formation of a certain academic reputation of the research team, and promote the scientific management of China's salt marsh wetlands.	

Effects of Ground and Underground Carbon Input on Soil Food Net of Spartina alterniflora	41371258	Natinonal	Soil decomposers, as the main performers of the decomposition process of ecosystems, interact with each other and coordinate with each other and play an important role in the decomposition of litter, which in turn affects the carbon and nitrogen cycle of soil food webs. We studied the soil nematode and soil microorganism as the research object by carrying out the investigation of the coastal wetland in eastern China, including Yancheng National Nature Reserve. At the same time, we collected the litter of Spartina alterniflora In order to comprehensively and comprehensively understand the effect of alien plant Spartina alterniflora on the decomposition process of invasive ecosystem. At the same time, under the background of global climate change, the factors such as comprehensive climate, littering and physicochemical properties and decomposing group were established. More accurate understanding of alien invasive plants Spartina littoral litter decomposition mechanism, in order to assess the ecological consequences of invasive plants to provide a scientific basis。	

Effects of Increased Exogenous Nitrogen Input and Plant Invasion on Key Processes of Alkaline Carbon Cycle and Its Mechanism	31670491	National	The increase of exogenous nitrogen input and plant invasion poses a serious threat to the global and ecological environment of our country, especially in sensitive ecosystems such as salt marsh. The results show that the increase of exogenous nitrogen input can promote plant invasion, which may exacerbate the impact of plant invasion on indigenous ecosystem processes. However, the potential causes and intensity of this impact are yet to be further explored. In this project, the Yangtze River estuary salt marsh was used as the research site, and the alien plant Spartina alterniflora and the indigenous plant reed were widely used as the research materials. Through the field control experiment, the invasive plants (Soil carbon and its components, etc.), stability (soil respiration, functional microbial community and its activity, etc.) at different stages of the replacement of almond carbon in different stages of indigenous plants, revealing global nitrogen effects of plant Invasion on the carbon cycle of ecosystem and Its mechanism under the Background of General Elevation. This study will facilitate understanding of the carbon cycle of sensitive ecosystems under the influence of exogenous nitrogen input and plant invasion, and provide a theoretical reference for predicting the carbon processes of ecosystems in the context of global change.	Nie Ming

5.i-1-2 Scientific Research Program

Existing partners include Beijing Forestry University, Fudan University, Nanjing Normal University, Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, Nanjing Forestry University, Nanjing Environmental Science Research Institute of the Ministry of Environmental Protection, Beijing Zoo, Yancheng Institute of Technology, Yancheng Normal College, Jiangsu Forestry Bureau and other units. In order to make a detailed comparison with similar types of heritages domestic and abroad, the nominating authority will also expand and strengthen cooperation with relevant international organizations in scientific research projects.

(1) Basic scientific researches

1) The background investigation and comprehensive scientific monitoring of the resources of the nominated properties, such as natural conditions, flora and fauna and species, geological and geomorphological observation, the cultural history and social basic situation investigation of the nominated properties.

2) Long - term location monitoring of representative ecosystems of nominated properties, such as habitat monitoring and management of migratory birds, species dynamics and habitat management of key protected birds such as red-crowned cranes, spoon-billed sandpiper, Pere David's Deer population dynamics, coastal wetland vegetation succession research, through remote sensing data and field monitoring and investigation data to establish GIS database, monitoring vegetation changes, wetlands dynamic monitoring and analysis.

3) Through the geological history period, and the interaction of the river and

tidal current, a lot of researches will be conducted in the field of the formation of radial sand ridges, dynamics, hydrodynamic changes and geomorphologic prediction, remote sensing analysis of sea surface flow field, sediment distribution simulation.

4) On the basis of cooperation of international and domestic scientific researches, we will focus on the comprehensive factors that affect the wintering population of red-crowned cranes. Especially, some 200 Pere David's Deer have a deep influence on the winter habitat and night habitat of red-crowned cranes.

(2) Management application research

1) Natural science research: including biodiversity, geology and geomorphology, disaster prevention and control and other related fields. Research on effective protection and scientific utilization of biodiversity, including tracking application of migratory birds, stopover habitat, artificial breeding of Pere David's Deer, research on dynamic management of landscape ecological network of nominated properties, dynamic change of landscape of nominated properties, etc. From large spatial scales, coastline dynamic caused by global climate change may have a significant influence on biodiversity in Yancheng reserve effect and dynamic effect of red-crowned cranes wintering population, which would help to develop counte rmeasures.

2) Social science research: the scientific researches will be focused on the relationship between the nominated properties and social economy; impact studies about National and local government policy benefits, rules of relevant international organizations (such as the United Nations Framework

Convention on climate, the United Nations environment development programme) on protection and development; study on the influence of traditional culture and community development on the ecological environment system of the nominated properties; study on the influence of human activities on animal and plant habitat and animal activities; study on tourism activities, development patterns and tourism management of nominated properties; research on the number of people, behavior impact on the environment, the degree of research.

3) Conservation management researches: socio - economic development planning and community development researches for nominated areas. Study on the protection and management of nominated properties; research on the construction of geographical information system for the nominated properties; research on scientific research cooperation and experimental base construction of nominated properties, coordination mechanism of local residents and social forces involved in protection, supervision and management.

5.i-2 Heritage display

In the nominated properties, the traditional and modern media means to and have been used to promote their advocacy and to show display activities mainly in the following ways:

(1) To promote the contents of the World Natural Heritage, through the text, pictures, multimedia, physical and other ways to publicize the heritage value, heritage resources protection, ecological and environmental protection and other aspects of science knowledge.

Existing facilities of the nominated properties:

- Exhibition Center of Jiangsu Yancheng National Nature Reserve

At present, in the experimental area of Jiangsu Yancheng National Nature Reserve has been established to show a display center where completes the construction area of 9600 m^2. The exhibition center introduces the basic situation of the protected area through sound and video, as well as the natural survival of the birds and beasts in the protected area. At the same time, the sample hall has collected more than 180 kinds of bird specimens, showing birds diversity of nominated properties, and restoring the wetlands of the typical living environment of waders.

- Exhibition Center of Jiangsu Dafeng National Nature Reserve

Jiangsu Dafeng National Nature Reserve is located in the China Pere David's Deer park, an area of 2100 m^2, the exhibition room mainly describes the distribution of Pere David's Deer, growth process and habits, while displaying the Pere David's Deer and other wild animal specimens. There is a special audio-visual studio, broadcast special feature film " Pere David's Deer hometown".

- Identify signs:

The identification facilities other than the display and promotion of buildings are mainly distributed along the route.

● Warning signs:

Warn visitors not to pursue wild animals to chase intimidation; an important area of wildlife habitat to emphasize and remind the road vehicles to pay attention to ban, slow down.

● Publicity signs:

Include the promotion of Yellow Sea wetlands resources value of Yancheng, the publicity is enhanced in the concept of protection.

(2) The use of television, radio, network, press release and other means to widely publicize the heritage of the nomination of outstanding natural quality and important scientific and aesthetic value, and enhance public awareness of the protection of heritage sites.

Table 5-8 Media Report and Documentaries of Nominated Properties

Time	Name	Contents
1999	Vast Wetland	Describe the pleasurable sight of Yancheng National Nature Reserve
2005	Graceful Red-Crowned Crane	Life history traits of Red-Crowned Crane in Jiangsu Yancheng National Nature Reserve
2013	Song of Red-Crowned Crane	Life history traits of Red-Crowned Crane in Jiangsu Yancheng National Nature Reserve
2017	Birds of China	Bird Propaganda film of State Forestry Bureau
2017	Red-Crowned Crane reproduced naturally	People's network: The successful natural reproduction of red - crowned crane for the first time in Yancheng, Jiangsu province
2017	Baby Red-Crowned Crane was born through human incubating	Yancheng Evening Newspaper: Baby Red-Crowned Crane was born through human incubating for the first time in Yancheng, Jiangsu province
2006	Return of Pere David’s Deer	CCTV: The history of return of Pere David’s Deer

Time	Name	Contents
2016	Re-introduced into the wild habitat of Pere David's Deer	CCTV13: the 30th anniversary of the return of Dafeng Pere David's Deer and the success of wild breeding ceremony
2017	The fight for the King Deer	CCTV:The process of the fight for the King Deer in the Jiangsu Dafeng National Nature Reserve

5.j Staffing levels and expertise

At present, Jiangsu Dafeng National Nature Reserve has a total of 85 staff, and Jiangsu Dafeng National Nature Reserve has a total of 100 staff. The two protected area administrations conduct regular business, legal and cultural assessments with the following training activities.

Scientific research personnel got involved in international important wetland protection training, management planning, ecological monitoring and learning in the recent years. Executive staff participated in the training of terrestrial wild animal epidemic disease surveillance. Two nature reserves invited Yancheng Normal College Associate Professor, Jiangsu Guolei Law Firm lawyers conducted legal education and study for all employees.

Also, two nature reserves carried out the red-crown crane cultural academic reports, eco-tourism cultural products exchange. Eight environmental monitoring staff were sent to the environmental monitoring team to carry out business training and coping ability of environmental issues. 5 staff participated in the UAV flight patrol training and 2 staff participated in the professional skills training such as yachting training.

Table 5-9 Staff and organization structure

Management Bureau		Jiangsu Yancheng Nature Reserve	Jiangsu Dafeng Nature Reserve	Management Bureau		Jiangsu Yancheng Nature Reserve	Jiangsu Dafeng Nature Reserve
Division	Directors	5	2	Education	Master	2	8
	Administrative office	17	4		Bachelor	28	30
	Patrolling	19	2				
	Research	3	14		College	30	52
	Communication	2	2				
	Community	3	6		Vocational	25	10
	Tourism	36	70				
	Total	85	100		Total	85	100

6. Monitoring

6.a Key indicators for measuring state of conservation

The monitoring contents mainly cover the following aspects and establish the corresponding monitoring index system for the nominated properties inYancheng (see Table 6-1).

A total of seven categories of monitoring sites, bio-ecological, environmental conditions, natural beauty, geology and geomorphology, earthquake activity, tourism activities, illegal activities and community status monitoring were set up under 8 stations of protection and management.

1. **Bio-ecological monitoring**: using the methods of fixed sample plots (transacts) and tracking monitoring, the contents of monitoring are: the number of species and habitat of endangered species such as Red-crowned crane, Oriental White Stork, Black-faced Spoonbill, Spoon-billed Sandpiper, Pere David's Deer and Chinese River Deer in the nominated properties, as well as the epidemic disease, the population of migratory birds, the status of habitat vegetation, and so on.

2. **Environmental monitoring**: using of location monitoring methods, the contents of monitoring are: meteorological, atmospheric environment, water environment, sound environment, solid waste, soil environment and other aspects of environmental monitoring.

3. **Geological and geomorphological monitoring**: using of positioning monitoring methods, the contents of monitoring are: regular monitoring for the key geological features of the sensitive regions, and so on.

4. **Earthquake activity monitoring:** using of positioning monitoring methods, the contents of monitoring are: regular monitoring for the key earthquake

features of the sensitive regions, and so on.

5. **Tourism activities monitoring**: With the data of tourist center, the contents of monitoring are: the number of visitors, road traffic conditions, visitors safety and other aspects.

6. **Illegal activities monitoring**: by the patrol and remote sensing technology, the contents of monitoring are: indiscriminate hunting, excavation of silkworm, illegal sewage and so on.

7. **Community status monitoring**: by means of manual investigation, the contents of monitoring are: the production and living conditions, construction and related socio-economic indicators of local residents.

Table 6-1 List of monitoring indicators in planning

Monitoring index	Monitoring period	monitoring methods	Data storage unit
1. Biological monitoring			
1.1 Distribution and quantity of vegetation community	Monthly	Manual monitoring / Automatic equipment monitoring / Remote sensing monitoring	Bureau of Jiangsu Yancheng National Nature Reserve; Bureau of Jiangsu Dafeng National Nature Reserve; Nanjing University, Fudan University and other institutions.
1.2 The number of key species in migratory birds	Half monthly during migration		
1.3 The habitat of key species in migratory birds			
1.4 Population dynamic of wintering bird species	Half monthly during winter		
1.5 The habitat of wintering bird species			
1.6 Epidemic disease of avian	Monthly		
1.7 Epidemic disease of Pere David's Deer			
2. Environmental monitoring			
2.1 Meteorological conditions (including air pressure, temperature, wind direction, wind speed,	Daily	Automatic equipment monitoring	Bureau of Meteorological in Yancheng; Bureau of

Monitoring index	Monitoring period	monitoring methods	Data storage unit
humidity, precipitation, sunshine, ground temperature)			Environmental Protenction in Yancheng; Bureau of Water Resource in Yancheng.
2.2 Noise			
2.3 Surface water quality, water level	Monthly		
2.4 Ground water quality			
2.5 River bank erosion			
2.6 Soil physical and chemical properties			
3. Geological and geomorphic monitoring			
3.1 Geological feature	Yearly	Equipment monitoring	Bureau of Land and Resources in Yancheng
3.2 Coastline and geomorphology monitoring		Remote sensing monitoring	
4 Seismic activity monitoring			
4.1 Seismic zone and fault monitoring	Yearly	Equipment monitoring	Yancheng Earthquake Bureau
5. Tourism status monitoring			
5.1 Tourists quantity	Daily	Manual monitoring / Automatic equipment monitoring	Bureau of Jiangsu Yancheng National Nature Reserve; Bureau of Jiangsu Dafeng National Nature Reserve.
5.2 Traffic			
5.3 Tourist s safety status			
5.4 Quality of tourist service facilities	Yearly		
6. Illegal activity monitoring			
6.1 Illegal hunting	Daily	Manual monitoring / Automatic equipment monitoring	Bureau of Jiangsu Yancheng National Nature Reserve; Bureau of Jiangsu Dafeng National Nature Reserve.
7. Community status monitoring			
7.1 Community population dynamics	Yearly	Manual monitoring	Bureau of Jiangsu Yancheng National Nature Reserve; Bureau of Jiangsu
7.2 Construction in the community			

Monitoring index	Monitoring period	monitoring methods	Data storage unit
			Dafeng National Nature Reserve.

6.b Administrative arrangements for monitoring property

In order to ensure that nominated properties could be protected and managed in sustainable manner, a multi-level monitoring system has been established to cover various aspects, which include the relevant management organizations of forestry, tourism, environmental protection, water conservancy, land resources, statistics and institutions of universities. The agencies carry out their duties, respectively so that of the monitoring and management work the heritage nomination sites can be carried out efficiently and orderly.The administrative units responsible for the monitoring of the nominations are mainly composed of the relevant departments of the Yancheng Municipal People's Government and the relevant departments of the Tinghu District, Dafeng District, Sheyang County, Dongtai Municipal Government and the administrative organ of the protected area where the nominees are nominated in Table 6-2.

Table 6-2 List of local administrative units responsible for monitoring heritage nomination

Monitoring Department	Contact Information		
	Telephone	Address	Postal Code
Bureau of Jiangsu Yancheng National Nature Reserve	+86-0515-82642202	Wanghe Road 8, Xinyang Harbor, Tinghu District, Yancheng, Jiangsu, China	224057
Bureau of Jiangsu Dafeng National Nature Reserve	+86-0515-832393017	Caomiao Town, Dafeng District, Yancheng, Jiangsu, China	224136

Monitoring Department	Contact Information		
	Telephone	Address	Postal Code
Bureau of Environmental Protenction in Yancheng	+86-0515-86660716	Shiji Avenue 21, Xindu Street, Tinghu District, Yancheng, Jiangsu, China	224008
Bureau of Environmental Protenction in Tinghu District	+86-0515-66690357	Xiwang Avenue 59, Tinghu District, Yancheng, Jiangsu, China	224008
Bureau of Environmental Protenction in Dafeng Distric	+86-0515-83513342	Xingfu West Avenue 7, Dafeng District, Yancheng, Jiangsu, China	224100
Bureau of Environmental Protenction in Sheyang County	+86-0515-82323771	Jiefang Road 52，Sheyang County, Yancheng, Jiangsu, China	224300
Bureau of Environmental Protenction in Dongtai City	+86-0515-85212259	Jinhai Road 1, Dongtai City, Yancheng, Jiangsu, China	224200
Bureau of Urban and Rural Construction in Yancheng	+86-0515-88423711	Jiefang South Road 150, Yancheng, Jiangsu, China	224005
Bureau of Urban and Rural Construction in Tinghu District	+86-0515-88333316	Airport road and Xinhe road junction, Tinghu District, Yancheng, Jiangsu, China	224000
Bureau of Urban and Rural Construction in Dafeng District	+86-0515-83535353	Jiangkang East 82, Dafeng District, Yancheng, Jiangsu, China	224100
Bureau of Urban and Rural Construction in Sheyang County	+86-0515-2322214	Renmin West Road 66, Hede County, Yancheng, Jiangsu, China	224300
Bureau of Urban and Rural Construction in Dongtai City	+86-0515-85213809	Guangchang Road 8, Dongtai City, Yancheng, Jiangsu, China	224000
Bureau of Land and Resources in	+86-0515-88334564	Yulong East Road 59, Tinghu District, Yancheng,	224002

Monitoring Department	Contact Information		
	Telephone	Address	Postal Code
Yancheng		Jiangsu, China	
Bureau of Land and Resources in Tinghu District	+86-0515-88320279	Ping'an Road 1, Kaifang Avenue, Tinghu District, Yancheng, Jiangsu, China	224000
Bureau of Land and Resources in Dafeng Distric	+86-0515-83523066	Xingfu West Road 9, Dafeng District, Yancheng, Jiangsu, China	224199
Bureau of Land and Resources in Sheyang County	+86-0515-82323081	Renmin Road, 43, Sheyang County, Yancheng, Jiangsu, China	224300
Bureau of Land and Resources in Dongtai City	+86-0515-85214613	Land Mansion, Jinhai East Road 1, Dongtai City, Yancheng, Jiangsu, China	224200
Yancheng Meteorological Bureau	+86-0515-88412348	Daqing Middle Road 33, Tinghu District, Yancheng, Jiangsu, China	224005
Bureau of Meteorological in Tinghu District	+86-0515-88412348	Airport Road 19, Nanjiang County, Tinghu District, Yancheng, Jiangsu, China	224005
Bureau of Meteorological in Dafeng District	+86-0515-83812184	Xingfu East Road 4, Dazhong County, Dafeng District, Yancheng, Jiangsu, China	224000
Bureau of Meteorological in Sheyang County	+86-0515-82312915	100 m west of the intersection of Chenguang Road and Jiefang West Road, Sheyang County, Yancheng, Jiangsu, China	224300
Bureau of Meteorological in Dongtai City	+86-0515-85224142	Jinhai Middle Road 9, Dongtai City, Yancheng, Jiangsu, China	224200
Bureau of Water Resources in Yancheng	+86-0515-88334979	Yulong East Road27, Tinghu District, Yancheng, Jiangsu, China	224002
Bureau of Water Resources in Tinghu District	+86-0515-66690431	Xiwang Road 59, Tinghu District, Yancheng, Jiangsu, China	224002

Monitoring Department	Contact Information		
	Telephone	Address	Postal Code
Bureau of Water Resources in Dafeng District	+86-0515-83513651	Xingfu West Road, 5-2, Dafeng District, Yancheng, Jiangsu, China	224000
Bureau of Water Resources in Sheyang County	+86-0515-82352267	Jiefang East Road, Sheyang County, Yancheng, Jiangsu, China	224300
Bureau of Water Resources in Dongtai City	+86-0515-85212213	Guangchang Road 6, Dongtai City, Yancheng, Jiangsu, China	224200

6.c Results of previous reporting exercises

In order to better understand the resource value of nominated properties in Yancheng, and carry out the protection and management work of the nominated properties more efficiently, the management departments of nominated properties cooperate with universities and scientific research institutions to preceed a lot of scientific researches on its unique resources and value of monitoring work, which involve mammals, birds, amphibians, reptiles, fishes, benthic, plants. In addition, monitoring schedule includes ecological survey, food webs, etc. The scientific decision-making basis will be provided to the conservation and management for the nominated properties.

Table 6-3 Previous monitoring results for heritage nomination sites

Name	Content	Finisher	Publication or data storage
Asia Water Birds Census Jan, 1990	Wintering water birds, 102species 231876 birds	Mark Barter	Wetlands International
Asia Water Birds Census, Jan.8-10, 1991	Wintering water birds 120 species, 291758 birds	Yancheng Nature Reserve	Wetlands International
Asia Water Birds Census Nov-Dec., 1991	Wintering water birds 122 species, 299096	Yancheng Nature Reserve	Wetlands International

Name	Content	Finisher	Publication or data storage
Asia Water Birds Census middle Jan, 1993	Wintering water birds 65 species 183610 birds	Wang Hui	Wetlands International
Asia Water Birds Census Jan. 1994	Wintering water birds 49 species 100443 birds	Wang Hui	Wetlands International
Asia Water Birds Census Feb 1995	Wintering water birds 61 species 81167 birds	Wang Hui	Wetlands International
Asia Water Birds Census 1996	Wintering water birds 70 species 114493	Wang Hui	Wetlands International
Asia Water Birds Census 2004	Wintering water birds 63 species 105741	Mark Barter, Cao Lei, Lei Gang	Wetlands International
Asia Water Birds Census 2006	Wintering Water Birds 54 species 74109 birds	Mark Barter, Wang Hui	Wetlands International
Yancheng Coastal Wetlands and Its Protection of Biodiversity	It holds 559 species of wild plants, 31mammals, 394 birds, 8 amphibians and 26 reptiles, 284 fishes, 508 insects, 325 invertebrate inter-tide, and 89 zooplanktons	Lv Shicheng，Sun Ming, Deng Jindong, Wang Hui, Chen Hao, Gao Zhidong, Li Chunrong	Agro Environment and Development 2007
The changes of erosion or progradation of tidal flat and retreat or extension of wetland vegetation of the Yancheng coast, Jiangsu	The changes of erosion or progradation of tidal flat and retreat or extension of w etland vegetation of the Yancheng coast utilizing the satellite images of this coastal area shot in June 1992 , May 2002 and April 2005.	Zhang Xueqin, Wang Guoxiang, Wang Yanhong, Wang Zhiliang	MarineScience s 2006

Name	Content	Finisher	Publication or data storage
An Estimation of Aboveground Vegetation Biomass in Coastal Wetland of Yancheng Natural Reserve	The total aboveground vegetation biomass of the study area could then be calculated by the best model.	Tan Qingmei, Liu Hongyu，Zhang Huabing, Wang Cong, Hou Mingxing	Journal of Natural Resource 2013
Study and Analysis on Types of Wetland Vascular Plant Communities andPlantResourcesin Yancheng	Community structure, species diversity and plant resources of wetland vascular plants in Yancheng are studied in by the method of combining the field investigation and analysis.	Zhu Ying	Nanjing Agricutral University 2014
A list of rare wild animals and plants in the Jiangsu Dafeng Pere David's Deer national nature reserve	List of wild fauna and flora in protected areas	Ding Yuhua, Liu Bin	Nanjing Normal University Press 2012
Terrestria Mammals Resources in Yancheng Nature Reserve, Jiangsu Province	Resources of terrestrial mammals, including quantity and distribution	Wang Jialian	Sichuan Journal of Zoology 2009
Investigation on Distribution of River Decry in Yancheng Nature Reserve	The number of river decry gradually decreased and the river decry gathered toward the center of Yancheng nature veserve.The reason for that was analyzed, and then the protection advice was put forward to offer reference for protecting river decry.	Cheng Hai, Chen Hao, Li Chunrong	Modern Agricultural Science and Technology 2010

Name	Content	Finisher	Publication or data storage
The Population and Distribution of Several Waterbird Species around the Coast of Yancheng,Jiangsu Province In Breeding Season	Study the number and distribution of the waterfowl	Chu Guozhong, Hou Yunqiu, Qian Fawen, Liu Xiping, Wang Hui	Scientia Silvae Sinicae 2000
Behavior Time Budget and Activity Rhythm of Saunders' s Gull *(Larus saundersi)*During Different Period of Breeding Cycle at Yancheng of Jiangsu, China	Quantitative study on time budget and activity rhythm of Saunders' s Gull was conducted during different breeding cycle at Yancheng of Jiangsu from 1999 to 2002.	Wang Hongxing, Chu Guozhong, Qian Fawen, Hou Yunqiu	Scientia Silvae Sinicae 2004
Bird nature reserve of Yancheng national nature reserve, Jiangsu province	The distribution of birds in field monitoring, special investigation and bird watching have been analyzed for many years. Nearly 400 species of birds are collected, and the distribution and population quantity of each species are described, and a large number of photos are provided.	Lu Changhu	China Forestry Press 2017
Avian Diversity in Dafeng Milu National Natural Reserve	Study the avian diversity in Dafeng Milu National Natural Reserve using the line transect method.	LiuBin, Ding Yuhua，Ren Yijun，Xu Anhong，Xie Shengbin，Hou Libing	Chinese Journal of Wildlife 2012
Winter bird community structure and gradient	Analyze the indicator species, bird community	Ruan Demeng,	Acta Ecologica Sinica 2015

Name	Content	Finisher	Publication or data storage
change in different habitats at Xinyanggang Estuary, Yancheng Nature Reserve	structure and gradient change of wintering birds in different disturbed habitats.	Sun Yong, Cheng Jiawei, Liu Dawei, Lu Changhu	
Community of macrobenthic and shorebirds in Yancheng Nature Reserve	Study the resources status of macrobenthos, analysed the niche of macrobenthos on the tidal flat and the effect of Spartina alterniflora invasion on them. Study the resources status of shorebirds during the northward and southward migration and wintering period and the relationship between macrobenthos and shorebirds in spring and winter.	Hou Senlin	Nanjing Forestry University 2011
The Ecological Research of Macrobenthos Communities in wetland of Yan Cheng Nature Reserve	Analysed and compared the characteristics of macrobenthos communities in each basic habitat in a whole year.	Yu Xiaoyun	Nanjing Forestry University 2010

7. Documentation

7.a Photographs and audiovisual image inventory and authorization form

(i) Photographs

Photo Gallery 1 (Annex 6)

(ii) 35mm slide

50 photos (Annex 7)

(iii) Video disc

DVD disc (Annex 10)

(iv) electronic format photo collection

50 photos can be used on the web, resolution 300dpi, jpg format (Annex 11)

(v) Image list, photo and audiovisual material (use) authorization form (Annex 5)

Table 7-1 Photos and audio-visual materials such as the use of authorization of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

Order	Format (slide/ print/ video)	Caption	Date of Photo (mo/yr)	Photographer/Director of the video	Copyright owner (if different than photographer/director of video)	Contact details of copyright owner (Name, address, tel/fax, and e-mail)	Non exclusive cession of rights
1	Photographs	Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)	2014-2017	Chen Guoyuan Zhao Yongqiang Chen Bin	Chen Guoyuan Zhao Yongqiang Chen Bin	Chen Guoyuan 495982885@qq.com Zhao Yongqiang 447201002@qq.com Address: Wanghe Road 8, Xinyang Harbor, Tinghu District, Yancheng, Jiangsu, China Tel: +86-0515-82642202 Chen Bin 16210700102@fudan.edu.cn Address：G525, Jiangwan Campus, Fudan University, Shanghai, China Tel: +86-21- 021-51630706	Authorized use
2	35mm slide		2014-2017				Authorized use
3	Video disc		2014-2017				Authorized use
4	electronic format photo collection		2017	Yancheng Broadcasting Television	Yancheng Broadcasting Television	Address: Jiefang South Road 176, Tinghu District, Yancheng, Jiangsu , China Tel: +86-515-88436012	Authorized use

7.b Texts relating to protective designation, copies of property management plans or documented management systems and extracts of other plans relevant to the property

7.b-1 Protected Areas

Nature reserves Nature reserves refers to the representative of the natural system, rare and endangered wild animal and plant species of natural concentrated distribution area, has a special significance of natural relics and other protection objects of land, land water or sea area, according to the law to draw a certain area to be special protection and management of the area. Nature reserves are divided into provincial nature reserves and national nature reserves.

National nature reserves Nature reserves which are of typical significance, have significant international influence in science or have special scientific research value are listed as national nature reserves.

7.b-2 Conservation and management plans (copy of the heritage nomination sites)

The nominated properties develop the Conservation and Management Plan for the world natural heritage nomination sites in Yancheng Yellow Sea Wetlands (Annex 3).

7.b-3 Other relevant plans

(1) Master Plan of Jiangsu Yancheng National Nature Reserve (Environmental Protection Office of Jiangsu Province, 2009)

The plan was formulated in 2009 and approved by Environmental Protection Office of Jiangsu Province. There are fourteen chapters in the plan.

Chapter 1 summarizes the origin of the plan, the basis for the preparation, the guiding ideology and planning principles, as well as the planning scope and time limit.

Chapter 2 describes the basic situation of the protection area. Jiangsu Yancheng National Nature Reserve belongs to wildlife category in the wild animal type. Protection area is on the south side of the estuary of Guan river in north of Chenjiagang Town of Xiangshui County, north of Xiangshui Chenjiagang town of Guan River Estuary, on the north side of the estuary of Sancang river in south of Dongtai City. The western boundary of the area is mostly the old seawall in 50s, where is the part of the appropriate section to move to the west between Xiangshui County and Sheyang County, on the east side of the sea minus 3 m isothermal line for the boundary.

Chapter 3 elaborates the historical evolution and the significance of the protection area, the main object of the protection area and its orientation and evaluation, the evaluation of the functional zoning and the management of the protection area, and the protection status quo.

Chapter 4 sets out the overall objectives of the plan.

Chapter 5 describes resource conservation and management planning.

Chapter 6 deals with research and monitoring programs.

Chapter 7 deals with publicity and education.

Chapter 8 clarifies the rational exploitation and utilization of resources.

Chapter 9 sets out the comprehensive environmental improvement plan.

Chapter 10 clarifies the key construction project planning.

Chapter 11 sets out the administrative planning.

Chapters 12 through 14 illustrate the assessment of investment and the implementation of planned safeguards and benefit analysis.

(2) Master Plans for Jiangsu Dafeng National Nature Reserve (2013-2022) (Forestry Bureau Jiangsu Province, 2013)

Chapter 1 elaborates the background of the project, the basis of preparation, guiding ideology and principles, planning period and so on.

Chapter 2 describes the basic situation of the protected area and the status quo evaluation.

The protected area is situated in the southeast, where borders on gate of Tan Tu and Tun Men in Dongtai City. It is next to the Xin Cao farm in Jiangsu Province. It is connected to the forest farm of Dafeng and the Dongchuan farm in Shanghai on the west, and the north (northeast) is the vast ocean.

Chapter 3 sets out the overall layout of protected areas where includes the nature of protected areas and protection targets, planning objectives, functional zoning and layout of protected areas, and overall layout.

Chapter 4 sets out the planning.

Chapter 5 deals with key construction projects

Chapters 6 through 8 describe investment estimates and fundraising, safeguards and benefit evaluations.

7.c Form and date of most recent records or inventory of property

Table 7-2 List of the latest records and the date or list of properties in the heritage nomination sites

List name	Time
List of vegetation of the Yellow Sea Wetlands of Yancheng,	2017
The animal bird list of Yellow Sea Wetlands of Yancheng	2017
List of mammals of Yellow Sea Wetlands of Yancheng	2017
List of amphibians of Yellow Sea Wetlands of Yancheng	2017
List of reptiles of Yellow Sea Wetlands of Yancheng	2017
List of fish fauna of the Yellow Sea Wetlands of Yancheng	2017
List of zoobenthos of the Yellow Sea Wetlands of Yancheng	2017

7.d Address where inventory, records and archives are held

Table 7-3 Holder Information of the latest record of the Yellow Sea wetlands of Yancheng

Institution	Address	Post code
Department of House and Urban - Rural Development, Jiangsu Province	Caochangmen Avenue 88, Nanjing, Jiangsu, China	210036
Bureau for Jiangsu Yancheng National Nature Reserve	Wanghe Road 8, Xinyang Harbor, Tinghu District, Yancheng, Jiangsu, China	224057
Bureau for Jiangsu Dafeng National Nature Reserve	Caomiao Town, Dafeng District, Yancheng, Jiangsu, China	224136
Beijing Forestry University	Qinghua East Road35, Haidian District, Beijing, China	100083
Yancheng Normal University	South Road of Hope Avenue 2, Yancheng, Jiangsu, China	224007
Nanjing University	Hankou Road 22, Nanjing，Jiangsu, China	210093
Fudan University	Zhangheng Road 825, Pudong New District, Shanghai, China	201203

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